

Science, Technology, Engineering and Mathematics (STEM) Division

3322 College Drive, Vineland, NJ 08360

856-691-8600

**CS 203: Assembly Language and Computer Organization**

Syllabus

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

Prerequisite: CS 111 – Computer Science I or high school programming course with permission from instructor.

## Catalog Description:

## This course offers fundamentals of computer organization, registers, buses, processors, I/O and memory system. It also covers data representation, instruction sets, addressing models, subroutines, interrupts and traps of assembly language programming. Students will write and debug assembly language programs at the machine level. 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](https://cccnj.bncollege.com/shop/ccc/home).

## 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](http://rcsj.edu/elearning/online-proctoring).

### Grading Distribution

Grading to be determined by individual instructors.

Individual instructors may include the following assessment(s):

* Homework
* Lab Assignments
* Exams

### 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.

## CS 203 Core Competencies

This course focuses on two of RCSJ’s Core Competencies:

* Technological Competency
* Information Literacy

# Student Learning Outcomes: Assembly Language and Computer Organization

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| --- | --- | --- |
| **Successful completion of CS 203 will help students:** | **RCSJ Core Competencies** | **Evaluation / Assessment (Additional means of evaluation may be included by individual instructors)** |
| Understand the Binary Number system and hexadecimal representation. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand conversation between decimal, binary, hexadecimal number systems. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand computer architecture. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand Intel microprocessors and its registers. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand assembly language instruction set and writing source code. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand data transfer and addressing techniques. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand mathematical operations. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand branching instructions-conditional processing. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand stacks and procedures. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand shift and rotate instructions. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand strings, arrays, structures and macros. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Learn 32-bit/64/-bit windows programming and 16-bit MS-DOS programming. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand disk storage systems – file systems, disk directory, reading and writing disk sectors. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |
| Understand BIOS – level programming. | Technological Competency  Information Literacy | Homework, Lab  Assignments, Exams |

# Topical Outline

* Basic Concepts – binary numbers, hexadecimal number system, translating binary to decimal, translating decimal to binary
* Two’s Complement Notation, Converting Hexadecimal to Decimal and Converting Decimal to Hexadecimal Boolean Operations
* Processor Architecture – instruction execution cycle, processor architecture, memory management, components of an 1A-32 microcomputer
* Assembly Language Fundamentals – basic elements of assembly language assembling, linking and burning programs
* Defining Data, Symbolic Constants, Data Transfers, Addressing and Arithmetic Data Transfer Instructions, Addition and Subtraction
* Data-related Operators and Directives Indirect Addressing, JMP and Loop Instruction
* Procedures – linking to an external library, stack operations, defining and using procedures
* Conditional Processing – Boolean and comparison instruction, conditional jumps, conditional
* Integer Arithmetic – shift and rotate instructions, shift and rotate applications, multiplication and division instructions, extended addition and subtraction, ASCII and Packed Decimal Arithmetic
* Advanced Procedures Local Variables, Stack Parameters, Stack Frames
* Strings and Arrays – string primitive instructions, selected string procedures, two-dimensional arrays
* Structures and Macros – structures, macros, conditional-assembly directives
* 32-bit Windows Programming – Win32 Console Programming
* High-level Language Interface Inline Assembly Code, Linking to C++ Programs
* 16-bit MS-DOS Programming – MS-DOS Function Calls, MS-DOS File I/O Services
* Disk Fundamentals – disk storage systems, files systems, disk directory

**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](mailto: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](mailto: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](mailto:cweinhar@rcsj.edu); or Cumberland Campus – Meredith Vicente, Senior Director, Department of Special Services/Project Assist at 856-200-4688 or [mvicent1@rcsj.edu](mailto: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 must report crimes that pose an immediate threat to the campus Security Office, the local Police Department or the Sheriff’s Office.

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| --- | --- | --- |
| **Service** | **Resource** | **Phone Number/Location/Website** |
| **Non-Confidential**  Reporting    Law  Enforcement | Vineland Police Dept.  Millville Police Department  Cumberland Co. Sheriff’s Office  Cumberland County Emergency Services  Cumberland  Campus Security  856-200-4706 (Direct) | 856-691-4111  856-825-7010  856-451-4449  9-1-1    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  Nathaniel Alridge, Jr., JD, Director  Diversity and Equity, Title IX  and Judicial Affairs    Kellie W. Slade  Executive Director  Student Services, Student Life | 856-415-2154  Gloucester Campus  College Center, Room116  [*ajones@rcsj.edu*](mailto:ajones@rcsj.edu)  856-498-9948  Catherine J. Arpino Education and Humanities Center,  [*nalridge@rcsj.edu*](mailto:nalridge@rcsj.edu)  856-200-4615  Student & Enrollment Services Center  [*kslade@rcsj.edu*](mailto: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*](mailto: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*](http://www.centerffs.org/serv) |
| **Hospital**  Sexual Assault Nurse Examiner on Site | Inspira Medical Center  Vineland | 1505 W. Sherman Ave., Vineland, NJ  856-641-8000 |