

B.S. in Computer Science

Academic Program Guide for **New First-Year Students** (Effective 2021) Department of Computer Science (computerscience@rowan.edu)

Students who entered Rowan University prior to Fall 2018 should follow the guide for their program and start year in consultation with their advisor.

Rowan University Graduation Requirements for all Majors / Degrees

- Students must complete at least 120 semester hours (sh) of coursework that apply to their Rowan University degree.
- Students must have a cumulative GPA of at least 2.0 in Rowan University coursework. (Transfer courses/credit do not count toward the RU GPA.)
- A minimum of 30 sh of coursework must be completed at/through Rowan University.
- Only grades of “D-” or above may apply to graduation/degree requirements. (Some programs may set higher minimums.)
- Students must meet the Rowan Core and Rowan Experience Requirements.
 - An individual course can potentially satisfy one Rowan Core literacy and/or multiple Rowan Experience attributes.
 - Rowan Core & Rowan Experience designations are listed in course details in Section Tally (www.rowan.edu/registrar) and may also be searched on that site under “Attributes.” A list of Rowan Core courses is here: <https://confluence.rowan.edu/display/AS/Rowan+Core+Course+List>.
- Students must apply for graduation and should do so for the term in which they will complete all program requirements.

Program-Specific Graduation Requirements for this Major / Degree

- A grade of C- or better in Calculus I, Discrete Structures, Introduction to Object Oriented Programming, Object Oriented Programming/Data Abstraction, Computer Organization, and Data Structures and Algorithms is required for graduation and to take any course that have the above courses as a prerequisite. This policy applies whether these courses are taken locally or transferred.
- Graduate courses may be counted as restricted electives when takes as senior privilege or part of the accelerated BS/MS degree program.

Rowan Core Requirements¹

Students must satisfy all six Rowan Core Literacies. A minimum total of 3 sh of coursework is required to satisfy each Literacy. With the exception of the 9 sh counted here for Communicative Literacy, credits attached to the courses in this section will apply elsewhere.

- (COML) Communicative Literacy: *Must be met by the following three courses or their official equivalents:*
 - COMP 01111 College Composition I (3 sh) COMP 01112 College Composition II (3 sh) CMS 04205 Public Speaking (3 sh)*

***CMS 04205 is required as pre-requisite for one or more major courses in this program. Therefore, CMS 04205 or its transferred equivalent must be taken to fulfill this degree. CMS 04206 Digital Presentations does not substitute CMS 04205 Public Speaking.**
- (ARTL) Artistic Literacy *Recommendation from major:*
- (GLBL) Global Literacy *Recommendation from major:*
- (HUML) Humanistic Literacy *Recommendation from major:* INTR 01265 (3 sh counted under non-program)
- (QNTL) Quantitative Literacy *Recommendation from major:* MATH 01130 (4 sh counted under non-program)
- (SCIL) Scientific Literacy *Recommendation from major:* BIOL 01104, CHEM 06100 or PHYS 00220 (4 sh counted under non-program)

Subtotal of credits counted in this section: 9 sh

Rowan Experience Requirements

Students must satisfy all three Rowan Experience attributes. Credits attached to the courses in this section will apply elsewhere.

- (LIT) Broad-Based Literature Attribute *Recommendation from major:*
- (WI) Writing Intensive Attribute *Recommendation from major:* WA 01302 Technical Writing (3 sh counts under non-program)
- (RS) Rowan Seminar Attribute² *Recommendation from major:*

Non-Program Courses (minimum 18 sh)

Courses in this section cannot be in the major department.

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
INTR 01265	Computers and Society	Satisfies Humanistic Literacy			3
MATH 01130	Calculus I	Satisfies Quantitative Literacy			4
BIOL 01104, CHEM 06100 or PHYS 00220	Introduction to Evolution and Scientific Inquiry, Chemistry I or Introductory Mechanics	Satisfies Scientific Literacy			4
WA 01302	Technical Writing	Writing Intensive			3
	Authorized Lab Science course for CS majors	See list at end of program guide			4

Subtotal: 18 sh

¹ The Rowan Core requirements are waived for transfer students with an earned A.A. or A.S. degree from a NJ community/county college.

² The Rowan Seminar requirement is waived for all students transferring 24 or more approved credits into Rowan University at the time of initial entry.

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Major Requirements (64 sh)

SUMMARY OF MAJOR REQUIREMENTS

- 33 sh of Foundational Courses
 - 19 sh of Upper-Level and Capstone Courses
 - 12 sh of Computer Science Restricted Electives
-
- 64 sh total

FOUNDATIONAL COURSES

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
CS 00100	Computer Science Learning Community				1
CS 01205	Computer Lab Techniques				3
MATH 03160	Discrete Structures				3
MATH 01131	Calculus II				4
MATH 01210	Linear Algebra				3
STAT 02290	Probability and Statistical Inference for Computing Systems				3
CS 04113	Introduction to Object-Oriented Programming	students must be ready for MATH 01130			4
CS 04114	Object-Oriented Programming & Data Abstraction				3
CS 04222	Data Structures and Algorithms				4
CS 06205	Computer Organization				3
CS 07210	Foundations of Computer Science				3
Subtotal:					33

UPPER-LEVEL AND CAPSTONE COURSES

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
CS 04315	Programming Languages				3
CS 04390	Operating Systems				3
CS 04400	Senior Project				3
CS 07321	Software Engineering I				4
CS 07340	Design and Analysis of Algorithms				3
CS 07351	Cyber Security: Fundamentals, Principles, and Applications				3
Subtotal:					19

COMPUTER SCIENCE RESTRICTED ELECTIVES

Choose 12 credits from the courses in Banks 1 and 2 below.

Bank One (at least one Restricted Elective must be selected from this bank of courses)

	Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
<input type="radio"/>	CS 04394	Distributed Systems				3
<input type="radio"/>	CS 04430	Database Systems: Theory and Program				3
<input type="radio"/>	CS 06410	Data Communications and Networking				3
<input type="radio"/>	CS 06440	Cloud Computing and the Internet of Things				3
<input type="radio"/>	CS 07480	Intro to Data Mining				3

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Bank Two

	Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
<input type="radio"/>	CS 01395	Topics in Computer Science	multiple sections of this course with different topics can be taken.			3
<input type="radio"/>	CS 01400	Independent Study	can be counted as a single 3-hour restricted elective with the approval of the student's mentor/course advisor.			3
<input type="radio"/>	CS 02421	Big Data Tools and Techniques				3
<input type="radio"/>	CS 04301	Bioinformatics - Computational Aspects				3
<input type="radio"/>	CS 04305	Web Programming				3
<input type="radio"/>	CS 04350	Blockchain Programming				3
<input type="radio"/>	CS 04372	Advanced Android Programming				3
<input type="radio"/>	CS 04376	Advanced IOS Programming				3
<input type="radio"/>	CS 04380	Object Oriented Design				3
<input type="radio"/>	CS 04391	Concurrent Programming				3
<input type="radio"/>	CS 04392	System Programming and OS Internals				3
<input type="radio"/>	CS 04401	Compiler Design				3
<input type="radio"/>	CS 04440	Data Warehousing				3
<input type="radio"/>	CS 04471	Topics in Mobile Programming				3
<input type="radio"/>	CS 06310	Principles of Digital Computers				3
<input type="radio"/>	CS 06390	Introduction to Systems Simulation and Modeling				3
<input type="radio"/>	CS 06412	Advanced Computer Architecture				3
<input type="radio"/>	CS 06415	Wireless Networks, Protocols and Apps.				3
<input type="radio"/>	CS 06416	TCP/IP and Internet Protocols and Tech.				3
<input type="radio"/>	CS 06417	Principles of Network Security				3
<input type="radio"/>	CS 06420	Embedded Systems Programming				3
<input type="radio"/>	CS 06447	Introduction to IoT Upper Stack				3
<input type="radio"/>	CS 06470	Cyber Operations				3
<input type="radio"/>	CS 07310	Robotics				3
<input type="radio"/>	CS 07322	Software Engineering II				3
<input type="radio"/>	CS 07350	Computer Cryptography				3
<input type="radio"/>	CS 07353	Security of Mobile Devices				3
<input type="radio"/>	CS 07360	Introduction to Computer Graphics				3
<input type="radio"/>	CS 07370	Introduction to Information Visualization				3
<input type="radio"/>	CS 07380	Introduction to Computer Animation				3
<input type="radio"/>	CS 07390	Intro to Computer Game Design and Development				3
<input type="radio"/>	CS 07422	Theory of Computing				3
<input type="radio"/>	CS 07430	Human Computer Interaction				3
<input type="radio"/>	CS 07450	Artificial Intelligence				3
<input type="radio"/>	CS 07455	Machine Learning				3
<input type="radio"/>	CS 07460	Computer Vision				3
<input type="radio"/>	CS 07485	Web and Text Mining				3
<input type="radio"/>	CS 99300	Computer Field Experience	Permission of instructor required. Field experience may be from 3 to 12 credits; however only 3 credits can apply to the program requirements.			3
<input type="radio"/>	CS 99310	Advanced Learning Asst Experience in CS	Permission of instructor required.			3
<input type="radio"/>	CS 99490	Computer Science Research II				3
Subtotal						12

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SUMMARY OF GRADUATION REQUIREMENTS

- 64 sh of Program Requirements
 - 27 sh of Rowan Core and Rowan Experience
 - 29 sh of Free Electives
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- 120 sh total

Free Electives for this Major/Degree (29 sh)

Students should choose Free Electives that satisfy any Rowan Core or Rowan Experience requirements that are not fulfilled by Major or Non-Program courses.

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
Subtotal: 29 sh					

Total Program Credits Required for this Major / Degree: 120 SH

Authorized Lab Science Courses for Computer Science Majors

(4 sh counted under Non-Program Courses)

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
<input type="radio"/> ASTR 11220	Observational Astronomy				4
<input type="radio"/> ASTR 11230	Introductory Astronomy and Astrophysics				4
<input type="radio"/> BIOL 01104	Introduction to Evolution & Scientific Inquiry				4
<input type="radio"/> BIOL 01106	Introduction to Genetics				4
<input type="radio"/> BIOL 01203	Introduction to Cell Biology				4
<input type="radio"/> BIOL 10210	Human Anatomy and Physiology I				4
<input type="radio"/> BIOL 10212	Human Anatomy and Physiology II				4
<input type="radio"/> BINF 07250	Introduction to Bioinformatics				4
<input type="radio"/> MCB 01101	Foundations in Biology for Biomedical Sciences I				4
<input type="radio"/> PHYS 00220	Introductory Mechanics				4
<input type="radio"/> PHYS 00221	Intro. Thermodynamics, Fluids, Waves, & Optics				4
<input type="radio"/> PHYS 00222	Introductory Electricity and Magnetism				4
<input type="radio"/> PHYS 00300	Modern Physics				4
<input type="radio"/> PHYS 00325	Electric Circuits				4
<input type="radio"/> PHYS 00340	Optics and Light				4
<input type="radio"/> CHEM 06100	Chemistry I				4
<input type="radio"/> CHEM 06101	Chemistry II				4
<input type="radio"/> CHEM 09250	Quantitative Analysis				4
<input type="radio"/> CHEM 07200	Organic Chemistry I				4

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Computer Science Concentrations

If you declare a Concentration and choose the correct restricted electives from the list above, that designation will appear on your transcript. Specific guidelines for these optional Concentrations can be found here:

https://csm.rowan.edu/departments/cs/advising/bs_cs/bs_cs_concentrations/concentration_landing_page.html

The following Concentrations are available for the Computer Science major:

- Artificial Intelligence (C025)
- Blockchain Technologies and Cryptocurrencies (C715)
- Cybersecurity Defense (C711)
- Data Science (C710)
- Graphics, Visualization & Gaming Technology (C708)
- Mobile Application Development (C717)
- Networking Systems (C028)
- Software Engineering (C707)