

# B.S. in Computer Science

## Academic Program Guide for **New First-Year Students** (Effective 2021) Department of Computer Science ([computerscience@rowan.edu](mailto: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](http://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 Requirements<sup>1</sup>

*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**
- (ARTL) Artistic Literacy                      *Recommendation from major:*
- (GLBL) Global Literacy                         *Recommendation from major:*
- (HUML) Humanistic Literacy                 *Recommendation from major:*
- (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)
- (RS) Rowan Seminar Attribute<sup>2</sup>             *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

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

<sup>2</sup> 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
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- 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
<b>Subtotal:</b>					<b>33</b>

### 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
<b>Subtotal:</b>					<b>19</b>

### 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 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
<b>Subtotal</b>						<b>12</b>

## 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

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## 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://academics.rowan.edu/csm/departments/cs/advising/bs\\_cs/bsConcentrations.html](https://academics.rowan.edu/csm/departments/cs/advising/bs_cs/bsConcentrations.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)