B.S. in Computer Science (O701)

Academic Program Guide for **New First-Year Students**
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 Requirements[1]

*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   *Required for major:*   WA 01302 Technical Writing (3 sh counts under non-program)
○ (RS) Rowan Seminar Attribute[2]   *Required for major:*   CS 00100 Computer Science Learning Community (1 sh)
                                           (required for all incoming students and transfers)

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

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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 04113	Introduction to Object-Oriented Programming	students must be ready for MATH 01130			4
CS 04114	Object-Oriented Programming & Data Abstraction				3
CS 04215	Computer Lab Techniques				3
CS 04222	Data Structures and Algorithms				4
CS 06205	Computer Organization				3
CS 07210	Foundations of Computer Science				3
MATH 01131	Calculus II				4
MATH 01210	Linear Algebra				3
MATH 03150	Discrete Mathematics				3
STAT 02290	Probability and Statistical Inference for Computing Systems				3
				Subtotal:	33

UPPER-LEVEL AND CAPSTONE COURSES

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
CS 03351	Cyber Security: Fundamentals, Principles, and Applications				3
CS 04315	Programming Languages				3
CS 04321	Software Engineering I				4
CS 04400	Senior Project				3
CS 06395	Operating Systems				3
CS 07340	Design and Analysis of Algorithms				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
○	CS 02435	Database Systems: Theory and Program				3
○	CS 02480	Intro to Data Mining				3
○	CS 03440	Cloud Computing and the Internet of Things				3
○	CS 04394	Distributed Systems				3
○	CS 09410	Data Communications and Networking				3

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Bank Two

	Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
◯	CS 01303	Bioinformatics - Computational Aspects				3
◯	CS 01395	Topics in Computer Science	multiple sections of this course with different topics can be taken.			3
◯	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
◯	CS 02370	Introduction to Information Visualization				3
◯	CS 02421	Big Data Tools and Techniques				3
◯	CS 02440	Data Warehousing				3
◯	CS 02485	Web and Text Mining				3
◯	CS 03353	Security of Mobile Devices				3
◯	CS 03470	Cyber Operations				3
◯	CS 04305	Web Programming				3
◯	CS 04322	Software Engineering II				3
◯	CS 04350	Blockchain Programming				3
◯	CS 04372	Advanced Android Programming				3
◯	CS 04376	Advanced IOS Programming				3
◯	CS 04380	Object Oriented Design				3
◯	CS 04391	Parallel and Concurrent Programming				3
◯	CS 04392	System Programming and OS Internals				3
◯	CS 04401	Compiler Design				3
◯	CS 04444	Human Computer Interaction				3
◯	CS 04471	Topics in Mobile Programming				3
◯	CS 06310	Principles of Digital Computers				3
◯	CS 06390	Introduction to Systems Simulation and Modeling				3
◯	CS 06412	Advanced Computer Architecture				3
◯	CS 06420	Embedded Systems Programming				3
◯	CS 06447	Introduction to IoT Upper Stack				3
◯	CS 07310	Robotics				3
◯	CS 07350	Computer Cryptography				3
◯	CS 07422	Theory of Computing				3
◯	CS 07450	Artificial Intelligence				3
◯	CS 07455	Machine Learning				3
◯	CS 07459	Models of Deep Learning				3
◯	CS 07460	Computer Vision				3
◯	CS 08360	Introduction to Computer Graphics				3
◯	CS 08380	Introduction to Computer Animation				3
◯	CS 08390	Intro to Computer Game Design and Development				3
◯	CS 09415	Wireless Networks, Protocols and Apps.				3
◯	CS 09416	TCP/IP and Internet Protocols and Tech.				3
◯	CS 09427	Principles of Network Security				3
◯	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
◯	CS 99310	Advanced Learning Asst Experience in CS	Permission of instructor required.			3
◯	CS 99490	Computer Science Research II				3
					Subtotal	12

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SUMMARY OF GRADUATION REQUIREMENTS

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

Free Electives for this Major/Degree (28 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: 28 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
ASTR 11220	Observational Astronomy				4
ASTR 11230	Introductory Astronomy and Astrophysics				4
BIOL 01104	Introduction to Evolution & Scientific Inquiry				4
BIOL 01106	Introduction to Genetics				4
BIOL 01203	Introduction to Cell Biology				4
BIOL 10210	Human Anatomy and Physiology I				4
BIOL 10212	Human Anatomy and Physiology II				4
BINF 07250	Introduction to Bioinformatics				4
MCB 01101	Foundations in Biology for Biomedical Sciences I				4
PHYS 00220	Introductory Mechanics				4
PHYS 00221	Intro. Thermodynamics, Fluids, Waves, & Optics				4
PHYS 00222	Introductory Electricity and Magnetism				4
PHYS 00300	Modern Physics				4
PHYS 00325	Electric Circuits				4
PHYS 00340	Optics and Light				4
CHEM 06100	Chemistry I				4
CHEM 06101	Chemistry II				4
CHEM 09250	Quantitative Analysis				4
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)