B.S. in Computer Science

Academic Program Guide for **New First-Year Students** (Effective Fall 2018)
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)
- ◯ (ARTL) Artistic Literacy   *Recommendation from major:*
- ◯ (GLBL) Global Literacy   *Recommendation from major:*
- ◯ (HUML) Humanistic Literacy   *Recommendation from major:*   INTR 01266 (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:* INTR 01266 (3 sh counts under non-program)
- ◯ (RS) Rowan Seminar Attribute[2]   *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 01266	Computers and Society (WI)	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
	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.

B.S. in Computer Science

Major Requirements (62 sh)

SUMMARY OF MAJOR REQUIREMENTS

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

FOUNDATIONAL COURSES

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
CS 01000	Computer Science Learning Community	not required for transfer students			0
MATH 03160	Discrete Structures				3
MATH 01131	Calculus II	prereq MATH 01130 (C- or better)			4
MATH 01210	Linear Algebra	prereq MATH 01131 (C- or better)			3
STAT 02290	Probability and Statistical Inference for Computing Systems	prereq (MATH 03160 or MATH 03150) and MATH 01131 and CS 04113			3
CS 04113	Introduction to Object-Oriented Programming	students must be ready for MATH 01130			4
CS 04114	Object-Oriented Programming & Data Abstraction	prereq CS 04113 (C- or better)			4
CS 04222	Data Structures and Algorithms	prereq CS 04114 (C- or better) and (MATH 03160 or MATH 03150)			4
CS 06205	Computer Organization	prereq (CS 04113 or CS 04103) and (MATH 03160 or MATH 03150) and Sophomore standing			3
CS 07210	Foundations of Computer Science	prereq C- or better in (MATH 03160 or MATH 03150), and any one of the following: CS 01102, CS 04103, CS 01104, CS 04113			3
				Subtotal:	31 sh

UPPER-LEVEL AND CAPSTONE COURSES

Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
CS 04315	Programming Languages	prereq (CS 04222 C- minimum or CS 04225 D- minimum) and (CS 06205 C- minimum or ECE 09241 D- minimum)			3
CS 04390	Operating Systems	prereq CS 04222 and CS 06205			3
CS 06310	Principles of Digital Computers	prereq CS 06205; co-requisite: CS 06311			3
CS 06311	Digital Computer Laboratory	prereq CS 06205; co-requisite: CS 06310			1
CS 07321	Software Engineering I	prereq (CS 04222 or CS 04225) and (CMS 04205 or equivalent) and (COMP 01112 or equivalent)			3
CS 07340	Design and Analysis of Algorithms	prereq CS 04222 and CS 07210			3
CS 04400	Senior Project	prereq CS 04315 and CS 07340			3
				Subtotal:	19 sh

COMPUTER SCIENCE RESTRICTED ELECTIVES

Choose 12 credits from the courses below.

	Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
○	CS 01395	Topics in Computer Science	prereq CS 04222 or CS 04225; 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 04301	Bioinformatics - Computational Aspects	prereq (CS 01104 or CS 04103) and CS 01205 and BINF 07250			3
○	CS 04305	Web Programming	prereq CS 01205 and CS 04222			3
○	CS 04372	Advanced Android Programming	prereq CS 10271 or CS 04222 or CS 04225			3
○	CS 04376	Advanced IOS Programming	prereq CS 10275			3
○	CS 04380	Object Oriented Design	prereq CS 07340			3
○	CS 04391	Concurrent Programming	prereq CS 04390			3

B.S. in Computer Science

	Course #	Course Name	Course Attributes / Notes	Sem/Yr	Grade	Credits
○	CS 04392	System Programming and OS Internals	prereq CS 04.390 and CS 01.205			3
○	CS 04394	Distributed Systems	prereq (CS 06205 and CS 04222) or (ECE 09242 and CS 04255)			3
○	CS 04401	Compiler Design	prereq CS 07210 and CS 04315			3
○	CS 04430	Database Systems: Theory and Programming	prereq CS 04222			3
○	CS 04440	Data Warehousing	prereq CS 04430			3
○	CS 04471	Topics in Mobile Programming				3
○	CS 06390	Introduction to Systems Simulation and Modeling	prereq (CS 04222 or CS 04225) and (MATH 01210 or MATH 01235)			3
○	CS 06410	Data Communications and Networking	prereq CS 07340 and STAT 02290			3
○	CS 06412	Advanced Computer Architecture	prereq CS 06310			3
○	CS 06415	Wireless Networks, Protocols and Apps.	prereq CS 06410			3
○	CS 06416	TCP/IP and Internet Protocols and Tech.	prereq CS 06410			3
○	CS 06417	Principles of Network Security	prereq CS 06410			3
○	CS 06420	Embedded Systems Programming	prereq CS 04390 and ((CS 06310 and CS 06311) or (ECE 09241 and ECE 09242))			3
○	CS 07310	Robotics	prereq (CS 04222 and MATH 01210) or (CS 04225 and ENGR 01202 and MATH 01236)			3
○	CS 07322	Software Engineering II	prereq CS 07321			3
○	CS 07350	Computer Cryptography	prereq CS 07210 and CS 04222			3
○	CS 07351	Cyber Security: Fundamentals, Principles, and Applications	prereq CS 04222 and CS 06205			3
○	CS 07353	Security of Mobile Devices				3
○	CS 07360	Introduction to Computer Graphics	prereq (MATH 01210 or MATH 01.235) and CS 07.340			3
○	CS 07370	Introduction to Information Visualization	prereq CS 04222 or CS 04225			3
○	CS 07380	Introduction to Computer Animation	prereq (MATH 01210 or MATH 01236) and PHYS 00220			3
○	CS 07390	Intro to Computer Game Design and Development	prereq (CS 04222 or CS 04225) and (MATH 01210 or MATH 01235)			3
○	CS 07422	Theory of Computing	prereq CS 04222 and MATH 01131 and CS 07210			3
○	CS 07430	Human Computer Interaction	prereq CS 04222 or CS 04225			3
○	CS 07450	Artificial Intelligence	prereq (MATH 03160 or MATH 03150) and CS 04222 and CS 07210			3
○	CS 07460	Computer Vision	prereq CS 04222 and MATH 01210 and STAT 02390			3
○	CS 07470	Machine Learning	prereq (MATH 01210 or MATH 01325) and (STAT 02290 or ECE 09363)			3
○	CS 07480	Intro to Data Mining	prereq CS 04222 and MATH 01210 and STAT 02390			3
○	CS 07485	Web and Text Mining	prereq CS 04222 or CS 04225			
○	CS 99300	Computer Field Experience	prereq permission of instructor and (CS 04222 or CS 04225). Field experience may be from 3 to 12 credits; however only 3 credits can apply to the program requirements.			3
○	CS 99310	Advanced Learning Assistant Experience in CS	prereq permission of instructor			3
					Subtotal: 12 sh	

B.S. in Computer Science

Free Electives for this Major/Degree (31 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:	31 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	Concepts in 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
○	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

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

The following Concentrations are available for the Computer Science major:
- Artificial Intelligence (P702)
- Cyber Security (P709)
- Data Analytics (C706)
- Graphics, Visualization & Gaming Technology (P711)
- Information Technology (P703)
- Mobile Application Development (P710)
- Networking Systems (P705)
- Programming Languages & Compilers (P704)
- Software Engineering (P707)