

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSCS) DEGREE

## Program Learning Outcomes for the BSCS Degree

Upon completing the BSCS degree, students will be able to:

1. Be knowledgeable about algorithms and their use. Students will analyze new problems, choose appropriate algorithms for their solutions, and develop analytical skills in the manipulation of algorithms.
2. Demonstrate the ability to design and implement complex software systems. Students will demonstrate skill in their design and implementation and function effectively in teams.
3. Be knowledgeable about programming languages and their use. Students will demonstrate an understanding of distinguishing and mapping two different programming languages.
4. Demonstrate a deep knowledge in a subarea of Computer Science. Students will be able to explain issues in the selected subarea and demonstrate a depth of knowledge.
5. Communicate effectively to a client and user.

## Requirements for the BSCS Degree

For general university requirements, see [Graduation Requirements \(https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/\)](https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BSCS degree must complete:

- A minimum of 23-25 courses (83-85 credit hours), depending on course selection, to satisfy the major requirements.
- A minimum of 128-130 credit hours, depending on course selection, to satisfy degree requirements.
- A minimum of 14 courses (50-52 credit hours, depending on course selection) taken at the 300-level or above.
- A maximum of 5 courses (15 credit hours) from study abroad or transfer credit **after** matriculation at Rice may be applied towards specific major requirements. For additional departmental guidelines regarding transfer credit, see the [Policies](#) (p. 2) tab.

The BSCS degree is designed for students who are interested in an in-depth study of computer science to prepare themselves for a professional career in the computing industry.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor, or where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's [Official Certifier \(https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/\)](https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

## Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Computer Science		83-85
Total Credit Hours Required for the BSCS Degree		128-130

## Degree Requirements

Code	Title	Credit Hours
<b>Core Requirements</b>		
Math and Science Courses <sup>1</sup>		
MATH 101	SINGLE VARIABLE CALCULUS I	3
or MATH 105	AP/OTH CREDIT IN CALCULUS I	
MATH 102	SINGLE VARIABLE CALCULUS II	3
or MATH 106	AP/OTH CREDIT IN CALCULUS II	
Select 1 course from the following:		3
MATH 211	ORDINARY DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	
MATH 212	MULTIVARIABLE CALCULUS	
MATH 221	HONORS CALCULUS III	
MATH 222	HONORS CALCULUS IV	
Select 1 course from the following:		3-4
ELEC 303	RANDOM SIGNALS IN ELECTRICAL ENGINEERING SYSTEMS	
STAT 310 / ECON 307	PROBABILITY AND STATISTICS	
STAT 312	PROBABILITY & STATISTICS FOR ENGINEERS	
STAT 315 / DSCI 301	PROBABILITY AND STATISTICS FOR DATA SCIENCE	
Select 1 course from the following:		3
CMOR 302	MATRIX ANALYSIS	
CMOR 303	MATRIX ANALYSIS FOR DATA SCIENCE	
MATH 355	LINEAR ALGEBRA	
MATH 354	HONORS LINEAR ALGEBRA	
Select 1 from the following: <sup>2</sup>		4
PHYS 101 & PHYS 103	MECHANICS (WITH LAB) and MECHANICS DISCUSSION	
PHYS 111	HONORS MECHANICS (WITH LAB)	
PHYS 125	GENERAL PHYSICS (WITH LAB)	
Select 1 from the following: <sup>3</sup>		4
PHYS 102 & PHYS 104	ELECTRICITY & MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION	
PHYS 112	HONORS ELECTRICITY & MAGNETISM (WITH LAB)	
PHYS 126	GENERAL PHYSICS II (WITH LAB)	
Computer Science Courses		
COMP 140	COMPUTATIONAL THINKING	4
or COMP 160	INTRODUCTION TO GAME PROGRAMMING IN PYTHON	
COMP 182	ALGORITHMIC THINKING	4
COMP 215	INTRODUCTION TO PROGRAM DESIGN	4

ELEC 220	FUNDAMENTALS OF COMPUTER ENGINEERING	4
COMP 310	ADVANCED OBJECT - ORIENTED PROGRAMMING AND DESIGN	4
COMP 321	INTRODUCTION TO COMPUTER SYSTEMS	4
COMP 322 / ELEC 323	PRINCIPLES OF PARALLEL PROGRAMMING	4
COMP 382	REASONING ABOUT ALGORITHMS	4
COMP 411	PRINCIPLES OF PROGRAMMING LANGUAGES	4
or COMP 412	COMPILER CONSTRUCTION FOR UNDERGRADUATE STUDENTS	
COMP 421 / ELEC 421	OPERATING SYSTEMS AND CONCURRENT PROGRAMMING	4
<b>Elective Requirements</b>		
<i>Select 2 courses from departmental (COMP) course offerings (a minimum of 3 credit hours each) at the 300-level or above</i> <sup>4</sup>		6
<b>Capstone Requirement</b> <sup>5</sup>		
Design Component		
<i>Select 1 course from the following:</i>		3-4
COMP 410	SOFTWARE ENGINEERING METHODOLOGY	
COMP 413	DISTRIBUTED PROGRAM CONSTRUCTION	
COMP 416	GENOME-SCALE ALGORITHMS AND DATA STRUCTURES	
COMP 460 / ARTS 460	ADVANCED COMPUTER GAME CREATION	
Capstone		
<i>In consultation with a major advisor, select additional coursework at the 300-level or above to total a minimum of 11 credit hours</i> <sup>4</sup>		11
<b>Total Credit Hours Required for the Major in Computer Science</b>		<b>83-85</b>
Additional Credit Hours to Complete Degree Requirements <sup>*</sup>		12-14
<u>University Graduation Requirements</u> ( <a href="https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/">https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/</a> ) <sup>*</sup>		31
<b>Total Credit Hours</b>		<b>128-130</b>

### Footnotes and Additional Information

<sup>\*</sup> **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

<sup>1</sup> Typically, the Math and Science courses are taken during the freshman and sophomore years.

<sup>2</sup> The Computer Science department has determined that credit awarded for PHYS 141 *CONCEPTS IN PHYSICS I* is not eligible for meeting the requirements of the Computer Science major.

<sup>3</sup> The Computer Science department has determined that credit awarded for PHYS 142 *CONCEPTS IN PHYSICS II* is not eligible for meeting the requirements of the Computer Science major.

<sup>4</sup> At most 1 of these courses total (across Electives and Capstone) may be an independent study project (COMP 390, COMP 490, or COMP 491). Departmental approval is required to use a 600-level course as an elective.

<sup>5</sup> The capstone sequence represents a coherent set of courses in a computer science specialization chosen by the student. Departmental approval is required. Including the design component, the capstone requires a minimum of 15 credit hours.

## Policies for the BSCS Degree

### Program Restrictions and Exclusions

Students pursuing the BSCS degree should be aware of the following program restriction:

- As noted in Majors, Minors, and Certificates (<https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/>), under Declaring Majors, Minors and Certificates, students may not obtain both a BA and a BS in the same major. Students pursuing the Bachelor of Science in Computer Science (BSCS) Degree may not additionally pursue the BA Degree with a Major in Computer Science.

### Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (<https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/>). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university's official list of transfer credit advisors (<https://oaa.rice.edu/advising-network/transfer-credit-advisors/>) on their website: <https://oaa.rice.edu>. Students are encouraged to meet with their academic program's transfer credit advisor when considering transfer credit possibilities.

### Departmental Transfer Credit Guidelines

Students pursuing the BSCS degree should be aware of the following departmental transfer credit guidelines:

- Requests for transfer credit will be considered by the program director (and/or the program's official transfer credit advisor) on an individual case-by-case basis.
- All courses taken **after** matriculation at Rice and used for transfer credit must meet the following restrictions:
  - Such courses must have been offered as part of a regionally accredited four-year degree program in Computer Science at a U.S. or international college or university of similar standing.
  - Massive open online courses, continuing education courses, and courses designed solely for online degree programs will not be accepted.
  - No more than 5 courses (15 credit hours) may apply towards major requirements.
  - No more than 3 courses (12 credit hours) may apply towards the "Computer Science Courses" section of the Core Requirements.
  - No more than 2 courses (8 credit hours) may apply towards upper-level coursework within the "Computer Science Courses" section of the Core Requirements.
  - No more than 2 courses (8 credit hours) may apply towards the Capstone Requirement.

## Additional Information

For additional information, please see the Computer Science website: <https://www.cs.rice.edu/>

## Opportunities for the BSCS Degree

### Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see [Latin Honors \(https://ga.rice.edu/undergraduate-students/honors-distinctions/university/\)](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (*summa cum laude*, *magna cum laude*, and *cum laude*) and [Distinction in Research and Creative Work \(https://ga.rice.edu/undergraduate-students/honors-distinctions/university/\)](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

### Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this *Undergraduate - Graduate Concurrent Enrollment* opportunity, including specific information on the registration process can be found [here \(https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/\)](https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Computer Science (MCS) degree. For additional information, students should contact their undergraduate major advisor and the MCS program director.

## Additional Information

For additional information, please see the Computer Science website: <https://www.cs.rice.edu/>