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. Communicate effectively to a client and user.
5. Be knowledgeable in three different subareas of Computer Science (systems, application domains, and theory). Students will be able to explain issues in each subarea and demonstrate a depth of knowledge.

Requirements for the BSCS Degree

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

- A minimum of 20 courses (68-72 credit hours, depending on course selection) to satisfy the major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 12 courses (40-44 credit hours, depending on course selection) taken at the 300-level or above.
- A maximum of 5 courses (20 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/).) 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		68-72
Total Credit Hours Required for the BSCS Degree		120

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Math Courses [1]		
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	
MATH 212	MULTIVARIABLE CALCULUS	3
or MATH 222	HONORS CALCULUS IV	
or MATH 232	HONORS MULTIVARIABLE CALCULUS	
Select 1 course from the following:		*3-4*
ELEC 303	RANDOM SIGNALS IN ELECTRICAL ENGINEERING SYSTEMS	
STAT 310 / ECON 307	PROBABILITY AND STATISTICS	
STAT 311	HONORS PROBABILITY AND MATHEMATICAL 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 221	HONORS CALCULUS III	
MATH 354	HONORS LINEAR ALGEBRA	
MATH 355	LINEAR ALGEBRA	
Computer Science Courses		
COMP 140	COMPUTATIONAL THINKING	4
COMP 182	ALGORITHMIC THINKING	4
COMP 215	INTRODUCTION TO PROGRAM DESIGN	4
COMP 222	INTRODUCTION TO COMPUTER ORGANIZATION	4
COMP 301	COMPUTER ETHICS	3
COMP 312	INTRODUCTION TO PROGRAMMING LANGUAGES	3
COMP 318	CONCURRENT PROGRAM DESIGN	4
COMP 321	INTRODUCTION TO COMPUTER SYSTEMS	4
COMP 382	REASONING ABOUT ALGORITHMS	4
Select 1 course from the following:		*4*
COMP 402	PRODUCTION PROGRAMMING	
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
COMP 461	SENIOR DESIGN IN A ROBOTIZED WORLD

Breadth Requirements

Systems

Select 1 course from the following:		*3-4*
COMP 412	COMPILER CONSTRUCTION FOR UNDERGRADUATE STUDENTS	
COMP 421 / ELEC 421	OPERATING SYSTEMS AND CONCURRENT PROGRAMMING	
COMP 422	PARALLEL COMPUTING	
COMP 427	INTRODUCTION TO COMPUTER SECURITY	
COMP 429 / ELEC 429	INTRODUCTION TO COMPUTER NETWORKS	
COMP 436 / ELEC 410	SECURE AND CLOUD COMPUTING	
COMP 458	QUANTUM COMPUTING ALGORITHMS	
COMP 530	DATABASE SYSTEM IMPLEMENTATION	

Application Domains

Select 1 course from the following:		*3-4*
COMP 418	IOT PROGRAMMING AND DATA ANALYSIS	
COMP 431	WEB DEVELOPMENT	
COMP 440 / ELEC 440	ARTIFICIAL INTELLIGENCE	
COMP 442	REINFORCEMENT LEARNING	
COMP 447 / ELEC 447	INTRODUCTION TO COMPUTER VISION	
COMP 450 / ELEC 450 / MECH 450	ALGORITHMIC ROBOTICS	
COMP 459	MACHINE LEARNING WITH GRAPHS	
COMP 462	FUNDAMENTALS OF ROBOTIC MANIPULATION	

Theory

Select 1 course from the following:		*3-4*
COMP 409	ADVANCED LOGIC IN COMPUTER SCIENCE	
COMP 411	PRINCIPLES OF PROGRAMMING LANGUAGES	
COMP 414	OPTIMIZATION: ALGORITHMS, COMPLEXITY AND APPROXIMATIONS	
COMP 416	GENOME-SCALE ALGORITHMS AND DATA STRUCTURES	
COMP 423	INTRODUCTION TO MATHEMATICAL CRYPTOGRAPHY	
COMP 448 / MATH 448	CONCRETE MATHEMATICS	
COMP 463	COMPUTER GRAPHICS	

| COMP 480 | PROBABILISTIC ALGORITHMS AND DATA STRUCTURE |
| COMP 481 | AUTOMATA, FORMAL LANGUAGES, AND COMPUTABILITY |

Elective Requirements

Select 2 courses from departmental (COMP) course offerings (a minimum of 3 credit hours each) at the 300-level or above [2]	6
Total Credit Hours Required for the Major in Computer Science	**68-72**
Additional Credit Hours to Complete Degree Requirements [*]	17-21
University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) [*]	31
Total Credit Hours	**120**

Footnotes and Additional Information

[*]   **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.

[1]   Typically, the Math courses are taken during the freshman and sophomore years.

[2]   At most 1 elective may be an independent study project (COMP 390, COMP 490, or COMP 491). Students may take courses at the 500-level. However, the only 600-level courses that may be used as electives are COMP 631 and COMP 646.

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. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). 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 the applicable transfer credit

advisor as well as their academic program director when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

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

- 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 (20 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 1 courses (4 credit hours) may apply towards the Breadth 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/) (*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/). 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/).

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/.