COMPUTER SCIENCE

New Curriculum Starting Fall 2026 (https://catalog.rose-hulman.edu/catalog/undergraduate-programs-study/computer-science-bs-new-fall2026/)

The Computer Science curriculum prepares students for careers in all areas of the computer industry as well as for graduate studies in computer science and computer related fields. Students have also found a computer science major to be excellent preparation for careers in law, medicine, business administration, industrial engineering, biomedical engineering, and other technical and non-technical fields.

Computer science is a rapidly changing discipline. The lifetime of a particular computer system or software package can be very short. The computer science curriculum is designed to prepare students for multiple careers in a rapidly changing environment. The department's courses emphasize fundamental concepts and techniques that will last longer than present technology.

Computer science majors complete a core of basic computer science courses that includes the study of algorithms, data structures, database concepts, computer architecture, programming languages, operating systems, and software engineering. Majors also complete important courses in closely related fields, e.g., discrete mathematics, digital logic design, and probability and statistics. The major requires students to study all aspects of the science of computing, including hardware, software, and theory.

Courses in database systems, compilers, computer graphics, fractals and chaotic dynamical systems, artificial intelligence, theory of computation, analysis of algorithms, computer networks, computer vision, web-based information systems, and cryptography are available as advanced electives. A three-term senior project provides valuable practical experience in the specification, design, implementation, and documentation of large software systems. Qualified students can undertake independent study in advanced topics in computer science, participate in a research project with a faculty member, or complete a senior thesis.

Programming assignments and large projects are part of most computer science courses. These assignments familiarize students with the wide variety of tasks performed by software professionals. Programming assignments include system specification, system feasibility studies, system design, system maintenance studies, and user interface design in addition to system implementation (i.e., coding), testing (verification and validation), and documentation. Projects include both individual and team activities and require appropriate written and oral presentations.

Computer science majors have diverse interests and career goals. Five free elective courses allow students to tailor their undergraduate education to their specific goals. Students planning to undertake graduate study in computer science usually take additional advanced courses in computer science, electrical engineering, and mathematics.

The student chapter of the Association for Computing Machinery provides seminars and other technical activities throughout the year and sponsors the school's programming teams which compete in local, regional, and national contests. The national computer science honor society, Upsilon Pi Epsilon, has chartered its Indiana Alpha Chapter at Rose-Hulman.

Requirements

Summary of Graduation Requirements for the Computer Science Major

To complete the major in computer science a student must complete the following:

1. All required courses listed by number in the schedule of courses above:

Code	Title	Hours
CSSE 120	Introduction to Software Development	4
CSSE 132	Introduction to Systems Programming	4
CSSE 220	Object-Oriented Software Development	4
CSSE 230	Data Structures and Algorithm Analysis	4
CSSE 232	Computer Architecture I	4
CSSE 280	Introduction to Web Programming	4
CSSE 304	Programming Language Concepts	4
CSSE 332	Operating Systems	4
CSSE 333	Intro to Database Systems	4
CSSE 371	Software Requirements Engineering	4
CSSE 374	Software Design	4
CSSE 473	Design and Analysis of Algorithms	4
or MA 473	Design & Analysis of Algorithms	
CSSE 474	Theory of Computation	4
or MA 474	Theory of Computation	
Select one of the following options:		12
Option 1:		
CSSE 487	Senior Research Project I	
CSSE 488	Senior Research Project II	
CSSE 489	Senior Research Project III	
Option 2:		
CSSE 494	Senior Thesis I	
CSSE 495	Senior Thesis II	
CSSE 496	Senior Thesis III	
Option 3:		
CSSE 497	Senior Capstone Project I	
CSSE 498	Senior Capstone Project II	
CSSE 499	Senior Capstone Project III	
MA 111	Calculus I	5
MA 112	Calculus II	5
MA 113	Calculus III	5
MA 221	Matrix Algebra & Differential Equations I	4
MA 276	Introduction to Proofs	4
MA 374	Combinatorics	4
MA 381	Introduction to Probability with Applications to Statistics	4
ECE 233	Introduction to Digital Systems	4
ECE 332	Computer Architecture II	4
PH 111	Physics I	4
PH 112	Physics II	4
CHEM 111	General Chemistry I	3
CHEM 111L	General Chemistry I Lab	1
HUM H190	First-Year Writing Seminar	4

ENGL H290	Technical & Professional Communication	4
RHIT 100	Foundations for Rose-Hulman Success	1

2. Twelve credits of additional computer science courses numbered between 300 and 492 and designated as computer science electives. None of the credits may be from CSSE 372 Software Project Management, CSSE 373 Formal Methods in Specification and Design, CSSE 375 Software Construction and Evolution, CSSE 376 Software Quality Assurance, and CSSE 477 Software Architecture. The student's academic advisor must approve the courses to satisfy this requirement. Use of computer science courses numbered 490 through 492 to fulfill this requirement must be approved by the department head. Credits used to satisfy any requirements for a minor or secondary major pursued by a student cannot also be used to satisfy CS elective requirements for the student's primary or secondary major in Computer Science. Credits used by a student pursuing a secondary major in CS that are intended to satisfy the CS elective requirement can only be used to satisfy technical or free elective requirements within the student's primary major or not used towards any requirements within the primary major.
3. Four credits of science electives, which can be any CHEM, PH, BIO, or GEOL courses not already required for the computer science major.
4. Four additional credits of technical electives, consisting of any courses in biology, chemistry, engineering (except software engineering and engineering management), geology, mathematics, biomathematics, or physics.
5. Twenty-eight credits of additional courses offered by the Department of Humanities, Social Sciences, and the Arts. The distribution of these courses must meet the requirements of the Department of Humanities, Social Sciences, and the Arts.
6. Twenty credits of free elective courses. These courses must have the approval of the student's academic adviser. Free electives may be selected from any Rose-Hulman course.
7. A total of 192 credits.

Plan of Study

Below is a sample plan of study that illustrates one way to achieve the program requirements. Any given student's plan of study may differ based on a variety of factors (e.g., advanced credit, placement exams, adding a minor). Enrolled students will work with their academic advisor; utilize the degree audit/planner to create a specific plan of study.

Course	Title	Hours
Freshman		
Fall		
CSSE 120	Introduction to Software Development	4
MA 111	Calculus I	5
PH 111	Physics I	4
RHIT 100	Foundations for Rose-Hulman Success	1
HUM H190	First-Year Writing Seminar	4
	Hours	**18**
Winter		
CSSE 220	Object-Oriented Software Development	4
MA 112	Calculus II	5
PH 112	Physics II	4
HSSA Elective		4
	Hours	**17**
Spring		
CSSE 132	Introduction to Systems Programming	4
MA 113	Calculus III	5
ECE 233	Introduction to Digital Systems	4
Science Elective		4
	Hours	**17**
Sophomore		
Fall		
CSSE 232	Computer Architecture I	4
CSSE 280	Introduction to Web Programming	4
MA 221	Matrix Algebra & Differential Equations I	4
MA 276	Introduction to Proofs	4
	Hours	**16**
Winter		
CSSE 230	Data Structures and Algorithm Analysis	4
CSSE 332	Operating Systems	4
MA 374	Combinatorics	4
ENGL H290	Technical & Professional Communication	4
	Hours	**16**
Spring		
CSSE 333	Intro to Database Systems	4
ECE 332	Computer Architecture II	4
MA 381	Introduction to Probability with Applications to Statistics	4
HSSA Elective		4
	Hours	**16**
Junior		
Fall		
CSSE 371	Software Requirements Engineering	4
CSSE 304	Programming Language Concepts	4
CHEM 111	General Chemistry I	3
CHEM 111L	General Chemistry I Lab	1
HSSA Elective		4
	Hours	**16**
Winter		
CSSE 473	Design and Analysis of Algorithms	4
CSSE 374	Software Design	4
CS Elective		4
HSSA Elective		4
	Hours	**16**
Spring		
CSSE/MA 474	Theory of Computation	4
HSSA Elective		4
Free Elective		4
Free Elective		4
	Hours	**16**
Senior		
Fall		
Select one of the following:		4
CSSE 487	Senior Research Project I	
CSSE 497	Senior Capstone Project I	
CSSE 494	Senior Thesis I	
CS Elective		4
HSSA Elective		4
Free Elective		4
	Hours	**16**
Winter		
Select one of the following:		4
CSSE 488	Senior Research Project II	
CSSE 498	Senior Capstone Project II	
CSSE 495	Senior Thesis II	
CS Elective		4
HSSA Elective		4

Technical Elective		4
	Hours	**16**
Spring		
Select one of the following:		4
CSSE 489	Senior Research Project III	
CSSE 499	Senior Capstone Project III	
CSSE 496	Senior Thesis III	
Free Elective		4
Free Elective		4
	Hours	**12**
	Total Hours	**192**

Program Objectives

Computer Science Program Educational Objectives

Graduates from the computer science program will be prepared for many types of careers in the field of computing and be prepared for graduate study in computer science and in closely related disciplines. In the early phases of their careers, we expect

Rose-Hulman computer science graduates to be:

1. Computing professionals in a variety of organizations, including ones doing traditional software development, technological innovation, and cross-disciplinary work
2. Business and technological leaders within existing organizations
3. Recognized by their peers and superiors for their communication, teamwork, and leadership skills
4. Actively involved in social and professional service locally, nationally, and globally
5. Graduate students and researchers
6. Leaders in government and law as government employees, policy makers, governmental advisors, and legal professionals

Learning Outcomes

Computer Science Student Outcomes

Graduates of the program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

The faculty strives to maintain an open atmosphere that encourages mutual respect and support as well as learning and sharing of knowledge.

The computer science program is accredited by the Computing Accreditation Commission of ABET, https://www.abet.org, under the commission's General Criteria and Program Criteria for Computer Science and Similarly Named Computing Programs.