

Computer Science BS

Overview

Science and technology are the foundations of our future. The Department of Computer and Information Sciences (CIS) is focused on the understanding of fundamental scientific principles and the application of these principles to solving complex problems, using computing technology.

The **Bachelor of Science in Computer Science** provides an in-depth study of the science of computing, including mathematical/theoretical foundations as well as systems and application software development. Students take electives (4-5 courses) in topics such as artificial intelligence, machine learning, robotics, computer vision, graphics, game programming, bioinformatics, databases, big data, mobile and web application development, cloud computing, high performance computing, wireless and sensor networks, network and information security, and digital forensics. The program is for students with an interest in the fundamentals of computing, who want to be able to contribute to innovative research and product development. Our graduates have careers in software development, systems analysis, and consulting; they are also prepared for graduate study and research in Computer and Information Sciences.

Campus Location: Main

Program Code: ST-CSCI-BS

Distinction in Major

To graduate with distinction in this major, a student must satisfy the following criteria:

- have a minimum 3.50 major GPA and
- have a minimum 3.50 cumulative GPA.

Accelerated Programs

Accelerated programs provide a pathway for students to pursue both an undergraduate degree and an advanced degree in a shorter amount of time. Below is a list of available accelerated programs for students in the BS in Computer Science.

- BS in Computer Science / MS in Computer Science
- BS in Computer Science / MS in Computational Data Science

Undergraduate Contact Information

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Learn more about the Bachelor of Science in Computer Science.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives to view the requirements for their Bulletin year.

Bachelor of Science Requirements

Summary of Requirements for the Degree

1. University Requirements (123 total s.h.)
 - Students must complete all University requirements including those listed below.
 - All undergraduate students must complete at least two writing-intensive courses for a total of at least six credits at Temple as part of their major. The specific writing-intensive course options for this major are:

Code	Title	Credit Hours
All students MUST take:		
CIS 3296	Software Design	4
Second writing-intensive course can be chosen from:		
CIS 4397	Independent Research in Computer Science	3
CIS 4398	Projects in Computer Science	3

- Students must complete the General Education (GenEd) requirements.
 - See the General Education section of the *Undergraduate Bulletin* for the GenEd curriculum.
 - Students who complete CST majors receive a waiver for 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
- Students must satisfy general Temple University residency requirements.

2. College Requirements

- A minimum of 90 total credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), and/or the College of Engineering (ENG).
 - A minimum of 45 of these credits must be upper-level (courses numbered 2000 and above).
- Complete a one-credit first-year or transfer seminar.
 - SCTC 1001 CST First Year Seminar for every entering first-year CST student.
 - SCTC 2001 CST Transfer Seminar for every entering transfer CST student.

3. Major Requirements for Bachelor of Science (73-74 s.h.)

At least 9 courses required for the major must be completed at Temple. At least 7 CIS courses must be completed at Temple.

Code	Title	Credit Hours
Computer & Information Science courses		
CIS 1001	Introduction to Academics in Computer Science	1
CIS 1051	Introduction to Problem Solving and Programming in Python	4
or CIS 1057	Computer Programming in C	
CIS 1068	Program Design and Abstraction	4
or CIS 1968	Honors Program Design and Abstraction	
CIS 1166	Mathematical Concepts in Computing I	4
or CIS 1966	Honors Mathematical Concepts in Computing I	
CIS 2033	Computational Probability and Statistics	3
CIS 2107	Computer Systems and Low-Level Programming	4
CIS 2166	Mathematical Concepts in Computing II	4
CIS 2168	Data Structures	4
CIS 3207	Introduction to Systems Programming and Operating Systems	4
CIS 3223	Data Structures and Algorithms	3
CIS 3296	Software Design	4
CIS 4398	Projects in Computer Science ¹	3
or CIS 4397	Independent Research in Computer Science	
Computer Science Electives		
Select 15-16 credits from the following CS elective courses: ²		15-16
CIS 3100	Special Topics in CIS	
CIS 3203	Introduction to Artificial Intelligence	
CIS 3211	Automata, Computability, and Languages	
CIS 3217	Computer Architecture	
CIS 3219	Computer Graphics and Image Processing	
CIS 3242	Discrete Structures	
CIS 3308	Web Application Programming	
CIS 3319	Wireless Networks and Security	
CIS 3374	Quality Assurance & Testing	
CIS 3381	Cooperative Education Experience in Computer Science ³	
CIS 3441	Software Security	
CIS 3515	Introduction to Mobile Application Development	

CIS 3603	User Experience Design	
CIS 3605	Introduction to Digital Forensics	
CIS 3715	Principles of Data Science	
CIS 4282	Independent Study ³	
CIS 4305	Real Time Computer Systems (Not offered every year)	
CIS 4307	Introduction to Distributed Systems and Networks (Not offered every year)	
CIS 4308	Development of Multi-tier Client/Server Systems (Not offered every year)	
CIS 4319	Computer Networks and Communications	
CIS 4324	Compiler Design (Not offered every year)	
CIS 4331	Principles of Database Systems	
CIS 4345	Introduction to Cloud Computing	
CIS 4350	Seminar on Topics in Computer Science	
CIS 4360	Seminar on Topics in Computer Science	
CIS 4382	Independent Study ³	
CIS 4397 or CIS 4398	Independent Research in Computer Science (if not taken as capstone requirement) ¹ Projects in Computer Science	
CIS 4419	Securing the Internet of Things	
CIS 4515	Advanced Mobile Application Development	
CIS 4517	Data-Intensive and Cloud Computing	
CIS 4523	Knowledge Discovery and Data Mining	
CIS 4524	Analysis and Modeling of Social and Information Networks	
CIS 4526	Foundations of Machine Learning	
CIS 4615	Ethical Hacking and Intrusion Forensics	
Mathematics		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
Laboratory Science courses		
Two (2) laboratory science courses ⁴		8
Total Credit Hours		73-74

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GPA and other requirements are needed to register for CIS 4397.

2

Students can count one of the following as a CS elective course: MATH 2101 Linear Algebra, MATH 2103 Linear Algebra with Computer Lab, MATH 2043 Calculus III.

3

A maximum of eight (8) credits may be taken from CIS 3381, CIS 4282 and/or CIS 4382 to fulfill Computer Science elective requirements. In addition, a maximum of four (4) credits may be taken from CIS 3381 to fulfill Computer Science elective requirements.

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Must select one Lab Science Sequence from the options listed below. Lab Science A and Lab Science B must be taken from the same department.

Sequenced Computer Science BS Laboratory Science Requirements

Code	Title	Credit Hours
Biology Sequence		
Select one Biology Lab Science A:		
BIOL 1011	General Biology I	
BIOL 1111	Introduction to Organismal Biology	
BIOL 1911	Honors Introduction to Organismal Biology	
Select one Biology Lab Science B:		

BIOL 1012	General Biology II
BIOL 1112	Introduction to Biomolecules, Cells and Genomes
BIOL 1912	Honors Introduction to Biomolecules, Cells and Genomes
BIOL 2112	Introduction to Cellular and Molecular Biology
BIOL 2912	Honors Introduction to Cellular and Molecular Biology

Chemistry Sequence ¹**Select one Chemistry Lab Science A:**

CHEM 1021 & CHEM 1023	Introduction to Chemistry I and Introduction to Chemistry Laboratory I
CHEM 1031 & CHEM 1033	General Chemistry I and General Chemistry Laboratory I
CHEM 1951 & CHEM 1953	Honors General Chemical Science I and Honors Chemical Science Laboratory I

Select one Chemistry Lab Science B:

CHEM 1022 & CHEM 1024	Introduction to Chemistry II and Introduction to Chemistry Laboratory II
CHEM 1032 & CHEM 1034	General Chemistry II and General Chemistry Laboratory II
CHEM 1952 & CHEM 1954	Honors General Chemical Science II and Honors Chemical Science Laboratory II

Earth & Environmental Science Sequence ²**Select this Lab Science A:**

EES 2001	Physical Geology
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Select one Lab Science B:

EES 2011	Mineralogy I (with CHEM 1031 prerequisite)
EES 2021	Sedimentary Environments (no CHEM 1031 prerequisite)
EES 2061	Introduction to Geochemistry (with CHEM 1031 prerequisite)

Physics Sequence ³**Select one Physics Lab Science A:**

PHYS 1021	Introduction to General Physics I
PHYS 1061	Elementary Classical Physics I
PHYS 1961	Honors Elementary Classical Physics I
PHYS 2021	General Physics I
PHYS 2921	Honors General Physics I

Select one Physics Lab Science B:

PHYS 1022	Introduction to General Physics II
PHYS 1062	Elementary Classical Physics II
PHYS 1962	Honors Elementary Classical Physics II
PHYS 2022	General Physics II
PHYS 2922	Honors General Physics II

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Students can choose to mix-and-match the Chemistry Sequence A and B courses. However, they must take at least 1 course from Chemistry Sequence A and 1 from Chemistry Sequence B. Note: Chemistry courses consist of a three-credit lecture plus a one-credit lab.

2

For the EES Sequence, two of the three Lab Science B options require students to take CHEM 1031 as a prerequisite, but EES 2021 does not.

3

Students can choose to mix-and-match the Physics Sequence A and B courses. However, they must take at least 1 course from Physics Sequence A and 1 from Physics Sequence B.

Suggested Academic Plan

Bachelor of Science in Computer Science

Suggested Plan for New Students Starting in the 2023-2024 Academic Year

Year 1		
Fall		Credit Hours
CIS 1001	Introduction to Academics in Computer Science	1
Select one of the following:		4
CIS 1051	Introduction to Problem Solving and Programming in Python	
CIS 1057	Computer Programming in C	
MATH 1041 or MATH 1941	Calculus I or Honors Calculus I	4
SCTC 1001	CST First Year Seminar	1
ENG 0802 or ENG 0812 or ENG 0902	Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature	4
Elective		1
Credit Hours		15
Spring		
CIS 1166 or CIS 1966	Mathematical Concepts in Computing I or Honors Mathematical Concepts in Computing I	4
CIS 1068 or CIS 1968	Program Design and Abstraction or Honors Program Design and Abstraction	4
MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	4
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3
Credit Hours		15
Year 2		
Fall		
CIS 2168	Data Structures	4
IH 0852 or IH 0952	Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good	3
GenEd Breadth Course		3
Elective		3
Elective		3
Credit Hours		16
Spring		
CIS 2033	Computational Probability and Statistics	3
CIS 2107	Computer Systems and Low-Level Programming	4
GenEd Breadth Course		3
GenEd Breadth Course		3
Elective		3
Credit Hours		16
Year 3		
Fall		
CIS 2166	Mathematical Concepts in Computing II	4
CIS 3207	Introduction to Systems Programming and Operating Systems	4
CS BS Laboratory Science A		4
GenEd Breadth Course		3-4
Elective		1-0
Credit Hours		16

Spring		
CIS 3223	Data Structures and Algorithms	3
Computer Science Elective ¹		4
CS BS Laboratory Science B		4
GenEd Breadth Course		3
Elective		1
Credit Hours		15
Year 4		
Fall		
CIS 3296	Software Design	4
Computer Science Elective ¹		4
Computer Science Elective ¹		4
Elective		3
Credit Hours		15
Spring		
Select one of the following:		3
CIS 4397	Independent Research in Computer Science	
CIS 4398	Projects in Computer Science	
Computer Science Elective ¹		3-4
Elective		3
Elective		3
Elective		3-2
Credit Hours		15
Total Credit Hours		123

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Select from the Computer Science Electives list under Requirements.