Computer Science B.A. or B.S.

Computer Science B.A. Major

The B.A. Computer Science major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

Required

Computer Science:		
CS 1410	Computer Organization	3
CS 1510	Introduction to Computing	4
CS 1520	Data Structures	4
CS 1800	Discrete Structures	3
CS 2530	Intermediate Computing	3
CS 3730/5730	Project Management	1

Electives

Mathematics:		
Select two of the following:		6
MATH 1420	Calculus I [#]	
MATH 1421	Calculus II [#]	
MATH 2500	Linear Algebra for Applications	
MATH 3440/5440	Numerical Analysis	
MATH 3530	Combinatorics	
MATH 3752/5752	Introduction to Probability	
STAT 1772	Introduction to Statistical Methods	
STAT 4784/5784	Introduction to Machine Learning	
Computer Science:		18
Six courses including:		
Three courses from one specialty area		
One course from each of the remaining three areas		
Specialty area must include a project course (*)		
Foundations:		
CS 3530	Design and Analysis of Algorithms	
CS 3540	Programming Languages and Paradigms	
CS 3810/5810	Theory of Computation	
CS 4550/5550	Translation of Programming Languages [*]	
CS 4880/5880	Topics in Computer Science [†]	
Data and Applications:		
CS 3140/5140	Database Systems	
CS 3150/5150	Information Storage and Retrieval	
CS 3610/5610	Artificial Intelligence	
CS 3650/5650	Computational Biology	
CS 4620/5620	Intelligent Systems [*]	
CS 4880/5880	Topics in Computer Science [†]	

Software Engineering:		
CS 2720	Software Engineering	
CS 3120/5120	User Interface Design	
CS 3750/5750	Software Verification and Validation	
CS 4740/5740	Real-Time Embedded Systems [*]	
CS 4880/5880	Topics in Computer Science [†]	
Systems:		
CS 2420	Computer Architecture and Parallel Programming	
CS 2470	Networking	
CS 3430/5430	Operating Systems	
CS 4400/5400	System Administration	
CS 4410/5410	System Security [*]	
CS 4420	Applied Systems Forensics [*]	
CS 4880/5880	Topics in Computer Science [†]	

Electives		**3**
One course selected from among the Computer Science "area" courses and 2000-level or above courses meeting the Mathematics requirement.		
Total Hours		**45**

[*] A project course must be taken as one of the three in the specialty area.

[#] MATH 1420 and MATH 1421 are 4-hour courses.

[†] CS 4880 may be counted in a specialty area with department approval for the specific topic.

Computer Science B.S. Major

The B.S. Computer Science major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

Required

Computer Science:		
CS 1410	Computer Organization	3
CS 1510	Introduction to Computing	4
CS 1520	Data Structures	4
CS 1800	Discrete Structures	3
CS 2530	Intermediate Computing	3
CS 3730/5730	Project Management	1
Research:		
CS 4800	Undergraduate Research in Computer Science (topic pre-approved by department)	1

Electives

Mathematics:		
Select four from the following:		13
MATH 1420	Calculus I [#]	

Computer Science B.A. or B.S.

MATH 1421	Calculus II [#]	
MATH 2500	Linear Algebra for Applications	
MATH 3440/5440	Numerical Analysis	
MATH 3530	Combinatorics	
MATH 3752/5752	Introduction to Probability	
STAT 1772	Introduction to Statistical Methods	
STAT 4784/5784	Introduction to Machine Learning	
Computer Science:		24

Eight courses including:

A specialty of three courses from the Foundations area

A specialty of three courses from one other area

One course from each of the remaining two areas

One of the specialty areas must include a project course (marked with an asterisk *)

Foundations:

CS 3530	Design and Analysis of Algorithms	
CS 3540	Programming Languages and Paradigms	
CS 3810/5810	Theory of Computation	
CS 4550/5550	Translation of Programming Languages *	
CS 4880/5880	Topics in Computer Science [†]	

Data and Applications:

CS 3140/5140	Database Systems	
CS 3150/5150	Information Storage and Retrieval	
CS 3610/5610	Artificial Intelligence	
CS 3650/5650	Computational Biology	
CS 4620/5620	Intelligent Systems *	
CS 4880/5880	Topics in Computer Science [†]	

Software Engineering:

CS 2720	Software Engineering	
CS 3120/5120	User Interface Design	
CS 3750/5750	Software Verification and Validation	
CS 4740/5740	Real-Time Embedded Systems *	
CS 4880/5880	Topics in Computer Science [†]	

Systems:

CS 2420	Computer Architecture and Parallel Programming	
CS 2470	Networking	
CS 3430/5430	Operating Systems	
CS 4400/5400	System Administration	
CS 4410/5410	System Security *	
CS 4420	Applied Systems Forensics *	
CS 4880/5880	Topics in Computer Science [†]	
Electives:		**6**

Two courses selected from among the Computer Science "area" courses and 2000-level or above courses meeting the Mathematics requirements.

Total Hours	**62**

* A project course must be taken as one of the three in the specialty area.

\# MATH 1420 and MATH 1421 are 4-hour courses.

† CS 4880/5880 may be counted in a specialty area with department approval for the specific topic.

Four-Year Plan

Computer Science, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
CS 1510	Introduction to Computing	4
STAT 1772	Introduction to Statistical Methods	3
UNIFI/General Education or University Electives		6
	Hours	**13**
Spring		
CS 1520	Data Structures	4
CS 1800	Discrete Structures	3
UNIFI/General Education or University Electives		9
	Hours	**16**
Sophomore		
Fall		
CS 2530	Intermediate Computing	3
CS 1410	Computer Organization	3
UNIFI/General Education or University Electives		9
	Hours	**15**
Spring		
Computer Science Area		3
MATH 1420	Calculus I	4
UNIFI/General Education or University Electives		9
	Hours	**16**
Junior		
Fall		
Computer Science Area		6
UNIFI/General Education or University Electives		10
	Hours	**16**
Spring		
Computer Science Specialty		3
UNIFI/General Education or University Electives		12
	Hours	**15**
Senior		
Fall		
Computer Science Specialty		3
UNIFI/General Education or University Electives		12
	Hours	**15**
Spring		
Computer Science Elective		3

Computer Science Project		3
UNIFI/General Education or University Electives		8
Hours		**14**
Total Hours		**120**

Computer Science, B.S.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
CS 1510	Introduction to Computing	4
STAT 1772	Introduction to Statistical Methods	3
UNIFI/General Education or University Electives		9
Hours		**16**
Spring		
CS 1520	Data Structures	4
CS 1800	Discrete Structures	3
UNIFI/General Education or University Electives		9
Hours		**16**
Sophomore		
Fall		
CS 2530	Intermediate Computing	3
CS 1410	Computer Organization	3
UNIFI/General Education or University Electives		10
Hours		**16**
Spring		
Computer Science Area		3
Computer Science Foundations		3
MATH 1420	Calculus I	4
UNIFI/General Education or University Electives		6
Hours		**16**
Junior		
Fall		
Computer Science Foundations		3
Computer Science Math Elective		3-4
Computer Science Area		3
UNIFI/General Education or University Electives		7
Hours		**16-17**
Spring		
Computer Science Foundations		3
Computer Science Math Elective		3-4
Computer Science Specialty		3
UNIFI/General Education or University Electives		6
Hours		**15-16**
Senior		
Fall		
Computer Science Elective		3
Computer Science Specialty		3
UNIFI/General Education or University Electives		7
Hours		**13**
Spring		
Computer Science Elective		3
Computer Science Research		1
Computer Science Project		3

UNIFI/General Education or University Electives		5
Hours		**12**
Total Hours		**120-122**

Learning Outcomes

Computer Science, B.A.

- **Goal 1:** Students will be able to effectively communicate computing information to colleagues and the public.
  - **Outcome 1:** Students will be able to prepare and produce written communications using standard computing style and format.
  - **Outcome 2:** Students will be able to prepare and deliver an oral presentation on computing topics.
- **Goal 2:** Students will be able to apply computing knowledge to problems involving data and process.
  - **Outcome 3:** Students will demonstrate proficient knowledge and application of computing content.
- **Goal 3:** Students will be able to think critically about computing problems.
  - **Outcome 4:** Students will be able to specify a computing module's interface and design its implementation.
- **Goal 4:** Students will demonstrate the skills needed to work on a team successfully.
  - **Outcome 5:** Students will work on a team to analyze a computing problem and implement its solution.

Computer Science, B.S.

- **Goal 1:** Students will be able to effectively communicate computing information to colleagues and the public.
  - **Outcome 1:** Students will be able to prepare and produce written communications using standard computing style and format.
  - **Outcome 2:** Students will be able to prepare and deliver an oral presentation on computing topics.
- **Goal 2:** Students will be able to apply computing knowledge to problems involving data and process.
  - **Outcome 3:** Students will demonstrate proficient knowledge and application of computing content.
- **Goal 3:** Students will be able to think critically about computing problems.
  - **Outcome 4:** Students will be able to specify a computing module's interface and design its implementation.
  - **Outcome 5:** Students will be conduct a research or development project in which they specify a computing problem, investigate possible solutions, and implement a working system.
- **Goal 4:** Students will demonstrate the skills needed to work on a team successfully.
  - **Outcome 6:** Students will work on a team to analyze a computing problem and implement its solution.

Policies

Notes:

1. Undergraduate students who have been admitted to the university provisionally because of non-satisfaction of the high school

mathematics requirements may not enroll in any computer science credit course before this requirement has been met.

2. All courses counting toward a major or minor in the Department of Computer Science must be passed with a grade of C- or better.

3. Prerequisite courses in the Department of Computer Science must be passed with a grade of C before taking a subsequent course.

4. All majors in the Department of Computer Science require a project course (marked with asterisk in the degree statements). The course used to meet this requirement is to be taken in the area of specialization, i.e., an area in which at least three courses are taken.

5. All courses in a prerequisite chain to a course are considered regressive to it - students may not take them for credit after passing the later course. Additionally, CS 1120, CS 1130, CS 1160, CS 1170, CS ED 1310, and CS ED 1320 are regressive to CS 1520 and any course having it as prerequisite.

6. A student with a major in the Department of Computer Science cannot also receive a Computer Science minor.

7. A student with a major in the Department of Computer Science cannot also receive a Certificate in Computer Science.

8. A student with a minor in the Department of Computer Science cannot also receive a Certificate in Computer Science.

Related Programs

- Data Science Minor
- Mathematics B.A.