COMPUTER SCIENCE, BA

Degree: Bachelor of Arts (BA)
Major: Computer Science

Program Overview

The Bachelor of Arts degree program in computer science is a combination of a liberal arts program and a computing major. It is a professional program in the sense that graduates can be employed as computer professionals, but it is less technical than the Bachelor of Science degree program in computer science. This degree is particularly suitable for students with a wide range of interests. For example, students can major in another discipline in addition to computer science and routinely complete all of the requirements for the double major in a 4 year period. This is possible because over a third of the courses in the program are open electives. Furthermore, if a student is majoring in computer science and a second technical field such as mathematics or physics many of the technical electives will be accepted for both majors. Another example of the utility of this program is that it routinely allows students to major in computer science and take all of the pre-med courses in a four-year period.

This program provides students with a strong background in the fundamental skills and knowledge needed by all CS graduates while providing the greatest flexibility in selecting topics. Students can use their technical and open electives to pursue interests in software engineering, algorithms, artificial intelligence, databases, data mining, bioinformatics, security, computer systems, and computer networks. In addition to an excellent technical education, all students in the department are exposed to societal issues, ethics, professionalism, and have the opportunity to develop leadership and creativity skills.

Mission

The mission of the Bachelor of Arts degree program in computer science is to graduate students who have fundamental technical knowledge of their profession and the requisite technical breadth and communications skills to become leaders in creating the new techniques and technologies which will advance the field of computer science and its application to other disciplines.

Program Educational Objectives

a. To educate and train students in the fundamentals of computer science and mathematics

b. To educate students with an understanding of real-world computing needs

c. To train students to work effectively, professionally and ethically in computing-related professions

Learning Outcomes

As preparation for achieving the above educational objectives, the Bachelor of Arts degree program in computer science is designed so that students attain the ability to:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

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

Undergraduate Policies

For undergraduate policies and procedures, please review the Undergraduate Academics section of the General Bulletin.

Accelerated Master's Programs

Undergraduate students may participate in accelerated programs toward graduate or professional degrees. For more information and details of the policies and procedures related to accelerated studies, please visit the Undergraduate Academics section of the General Bulletin.

Program Requirements

Students seeking to complete this major and degree program must meet the general requirements for bachelor's degrees and the Unified General Education Requirements. Students completing this program as a secondary major while completing another undergraduate degree program do not need to satisfy the school-specific requirements associated with this major.

Students are required to complete at least 13 computer science and computer science related courses totaling at least 42 credit hours plus 8 credit hours of mathematics. The 13 computer science courses must include all 6 core courses and at least one course from each of the four computer science breadth areas. The remaining three courses may come from the list of approved technical electives.

Required Courses

Code	Title	Hours
Mathematics Requirement:		
Choose two of the following:		*8*
MATH 121	Calculus for Science and Engineering I	
or MATH 125	Math and Calculus Applications for Life, Managerial, and Social Sci I	
MATH 122	Calculus for Science and Engineering II	
or MATH 124	Calculus II	
or MATH 126	Math and Calculus Applications for Life, Managerial, and Social Sci II	
Core Requirement:		**21**
CSDS 132	Programming in Java	
CSDS 233	Introduction to Data Structures	
CSDS 281	Logic Design and Computer Organization	
CSDS 302	Discrete Mathematics	
CSDS 310	Algorithms	
CSDS 395	Senior Project in Computer Science	
Computer Science Breadth Courses:		
Breadth Area 1:		**3**

Choose one of the following:

Code	Title	Hours
CSDS 341	Introduction to Database Systems	
CSDS 356	Data Privacy	
CSDS 390	Advanced Game Development Project	
CSDS 393	Software Engineering	
Breadth Area 2:		**3-4**

Choose one of the following:

CSDS 312	Introduction to Data Science Systems	
CSDS 314	Computer Architecture	
CSDS 325	Computer Networks I	
CSDS 338	Intro to Operating Systems and Concurrent Programming	
Breadth Area 3:		**3-4**

Choose one of the following:

CSDS 337	Compiler Design	
CSDS 343	Theoretical Computer Science	
CSDS 344	Computer Security	
CSDS 345	Programming Language Concepts	
Breadth Area 4:		**3**

Choose one of the following:

CSDS 313	Introduction to Data Analysis	
CSDS 335	Data Mining for Big Data	
CSDS 340	Introduction to Machine Learning	
CSDS 391	Introduction to Artificial Intelligence	
Technical Electives		8-9
Total Hours		**50-52**

Technical Electives

Computer science related courses not listed below may be used as a technical elective but require prior permission from the student's academic advisor.

Code	Title	Hours
Any CSDS course		3-4
ECSE 301	Digital Logic Laboratory	2
ECSE 303	Embedded Systems Design and Laboratory	3
ECSE 315	Digital Systems Design	4
ECSE 317	Computer Design - FPGAs	3
ECSE 419	Computer System Architecture	3
ECSE 484	Computational Intelligence I: Basic Principles	3
ECSE 485	VLSI Systems	3
ECSE 488	Embedded Systems Design	3
MATH 201 or MATH 307	Introduction to Linear Algebra for Applications Linear Algebra	3
MATH 330	Introduction to Scientific Computing	3
MATH 380	Introduction to Probability	3
MATH 382	High Dimensional Probability	3
MATH 406/ PHIL 306	Mathematical Logic and Model Theory	3
MATH 408	Introduction to Cryptology	3
MATH 431	Introduction to Numerical Analysis I	3
MATH 444	Mathematics of Data Mining and Pattern Recognition	3
PHIL 393	Ethics of Artificial Intelligence and Emerging Technology	3

Sample Plan of Study

First Year

Fall		Hours
CSDS 132	Programming in Java	3
MATH 121 or MATH 125	Calculus for Science and Engineering I or Math and Calculus Applications for Life, Managerial, and Social Sci I	4
Academic Inquiry Seminar, Breadth, or Elective course [a]		3
Open elective		3
Open elective		3
	Hours	**16**

Spring		
MATH 122 or MATH 124 or MATH 126	Calculus for Science and Engineering II or Calculus II or Math and Calculus Applications for Life, Managerial, and Social Sci II	4
CSDS 233	Introduction to Data Structures	4
Academic Inquiry Seminar, Breadth, or Elective course		3
Open elective		3
	Hours	**14**

Second Year

Fall		
CSDS 281	Logic Design and Computer Organization	4
Breadth, or Elective course [a]		3
Open elective		3
Open elective		3
Open elective		3
	Hours	**16**

Spring		
CSDS 302	Discrete Mathematics	3
Breadth, or Elective course [a]		3
Open elective		3
Open elective		3
Open elective		3
	Hours	**15**

Third Year

Fall		
CSDS 310	Algorithms	3
Computer science breadth course		3
Breadth, or Elective course [a]		3
Open elective		3
Open elective		3
	Hours	**15**

Spring		
Computer science breadth course		3
Computer science breadth course		3
Technical Elective		3
Breadth, or Elective course [a]		3
Open elective		3
	Hours	**15**

Fourth Year

Fall

Computer science breadth course		3
Breadth, or Elective course [a]		3
Technical Elective		3
Open elective		3
Open elective		3
	Hours	**15**
Spring		
CSDS 395	Senior Project in Computer Science	4
Breadth, or Elective course [a]		3
Technical Elective		3
Open elective		4
	Hours	**14**
	Total Hours	**120**

a   Unified General Education Requirement.