COMPUTER SCIENCE, BACHELOR OF ARTS

Undergraduate Programs

(See also General Requirements for Departmental Majors (https://e-catalogue.jhu.edu/ksas-wse/undergraduate-policies/academic-policies/requirements-bachelors-degree/))

The objectives of our bachelor degree programs are to train computer scientists who will be able to:

- Successfully engage in professional practice in the computing sciences or apply computer science tools and techniques to solving problems in other disciplines.
- Engage in continuous learning, including advanced study in the computing sciences.
- Work successfully in both independent and team environments, including diverse and interdisciplinary teams.
- Lead teams and provide vision for innovation.
- Behave in a professional and ethical manner.
- Practice inclusion and advocate for diversity.

A successful major program of study leads to either the Bachelor of Arts in computer science (B.A.) or the Bachelor of Science in computer science (B.S.). Both degree programs require specific courses and/or credits in several key areas: computer science, math, basic science, humanities and social sciences. The Bachelor of Arts is intended for students who prefer a more traditional liberal arts curriculum, and therefore carries stronger requirements in non-technical areas. The Bachelor of Science degree has stronger technical requirements, particularly with respect to computer science course requirements.

Regardless of degree choice, there is much flexibility in how the requirements are fulfilled. Undergraduate majors may choose to pursue a broad selection of computer science and distributional courses, or to pursue a focus area within the field. Current foci primarily reflect departmental and school research strengths: big data, computational biology, fundamentals of computing, information security, natural language processing, robotics, systems and networking; and also include career paths for software engineering and entrepreneurship. Regardless of whether you pursue a particular focus or not, our bachelor programs provide excellent preparation for research within the department, summer internships, and post-graduation industry employment or graduate work.

Additional details regarding undergraduate programs can be found in the department's undergraduate advising manual (https://www.cs.jhu.edu/academic-programs/undergraduate-studies/undergraduate-academics/undergraduate-academic-advising-manual-2021/) or on the website at cs.jhu.edu (https://www.cs.jhu.edu).

Double Majors

It is possible for students to pursue a double major program in which one of the majors is computer science. The computer science requirements are flexible enough to allow for combination with most majors in the Whiting School of Engineering and the Krieger School of Arts and Sciences. In order to declare a first or second major in computer science, students should initiate an on-line request, and then will need to see an Academic Program Coordinator or the Director of Undergraduate Studies to complete the process.

Requirements for the B.A. Degree

To meet the course credit requirements for the B.A. in computer science, the student must complete a minimum of 120 credits. The distributional credit requirements for the B.A. degree are:

Code	Title	Credits
Computer Science		33
Mathematics		16
Basic Sciences		8
Humanities/Social Sciences		18
Foreign Language		6
4 Writing Intensive Courses		
Electives		39
Total Credits		**120**

Details and course recommendations of these distributional requirements are below. The area requirements add up to 81 credits and fulfill general university distribution requirements. Except for pure electives and where noted below, courses must not be taken on a S/U basis. Courses satisfying the CS credit requirements and the university writing requirement must have C- grades or higher; D grades may be counted in other areas. By university policy, no more than 18 D or D+ credits can be counted toward the total credit requirements for a degree.

Code	Title	Credits
COMPUTER SCIENCE (33)		
Core		
The following core courses in computer science must be included in a student's program:		
EN.500.112	Gateway Computing: JAVA (or 5 score on AP CS A exam)	3
or EN.500.113	Gateway Computing: Python	
or EN.500.114	Gateway Computing: Matlab	
EN.601.220	Intermediate Programming	4
EN.601.226	Data Structures	4
EN.601.229	Computer System Fundamentals	3
EN.601.433	Intro Algorithms	3
Foundations		
Option 1 - take one course that counts towards CS elective credits.		
EN.601.230	Mathematical Foundations for Computer Science (4)	
Option 2 - take two courses where only theory of computation counts towards CS credits (elective or upper level).		
EN.553.171	Discrete Mathematics	
or EN.553.172	Honors Discrete Mathematics	
EN.601.431	Theory of Computation (3)	
Upper Level		
At least 12 credit hours must be at the 300-level or above, not including EN.601.433.		12
CS Electives and General Restrictions		
Students must have at least 33 total credits in Computer Science courses, including the requirements above.		

No more than 3 independent type credits (courses numbered 601.5xx) and no more than 3 credits of short courses (1-credit special topics courses) can be counted toward this requirement. However, B.A. students doing the Senior Honors Thesis (EN.601.519 Senior Honors Thesis-EN.601.520 Senior Honors Thesis) may use an additional three credits of independent work toward their CS requirements, for a total of 6 credits.

No courses with grades below C- or with S/U grades can be used to fulfill this requirement unless they are not offered for a grade. At most 4 S/U credits may be applied towards this requirement.

MATHEMATICS (16)

The following courses must be included:		8
AS.110.108	Calculus I (Physical Sciences & Engineering)	4
AS.110.109	Calculus II (For Physical Sciences and Engineering)	4

The remaining 8 credits may be courses from Mathematics (AS.110.xxx) or Applied Math and Statistics (EN.553.xxx). At least one course must be 200-level or above. Strongly recommended:

AS.110.201	Linear Algebra
EN.553.311	Intermediate Probability and Statistics

BASIC SCIENCES (8)

Students must take two semesters of core science courses (any combination of Physics, Chemistry, or Biology), with their associated labs, totaling at least 8 credits. AP credit is an acceptable substitute for these courses and labs.	8

HUMANITIES AND SOCIAL SCIENCES (18)

Six courses in the Humanities/Social Sciences must be taken, with each course at least 3 credits. At least two 3-credit courses at the 300-level or above are required. As befits a B.A. degree, students have ample flexibility to choose courses that broaden the scope of their study, in consultation with their advisors. A subset of the courses selected to satisfy this requirement should demonstrate coherence within an area. Any course with Humanities or Social Sciences area designators may fulfill these distributional requirements. [1]	18

FOREIGN LANGUAGE (6)

At least 6 credits in one foreign language or demonstrated proficiency at the intermediate level are required. These foreign language credits are in addition to the 18 required Humanities/Social Sciences credits.	6

WRITING REQUIREMENT

All primary computer science majors pursuing a B.A. degree are required to fulfill the university's requirement of four writing intensive courses, each at least 3 credits. These courses may overlap other requirement areas.

At least one course must be explicitly focused on writing skills in English. See the advising manual for a list of options. [2]

ELECTIVES (39)

Electives may be any credit-bearing courses, to be chosen by the student with the guidance of their advisor as needed.	39

[1] See the Distribution tab in the Requirements for a Bachelor's Degree (https://e-catalogue.jhu.edu/ksas-wse/undergraduate-policies/academic-policies/requirements-bachelors-degree/) section for two exceptions to the rule that each H/S distribution course be at least 3 credits.

[2] See the advising manual (https://www.cs.jhu.edu/academic-programs/undergraduate-studies/undergraduate-academics/undergraduate-academic-advising-manual-2021/), Major Degree Requirements, Liberal Arts Courses section for details.

Sample Program

First Year

First Semester	Credits	Second Semester	Credits
AS.110.108	4	AS.110.109	4
EN.500.112	3	EN.601.220	4
Writing Course[1]	3	EN.601.230	4
Elective	3	Humanities/Social Science Course	3
HEART Course (EN.500.111)	0-1		
FYS Course (EN.501.xxx)	2-3		
	15-17		**15**

Second Year

First Semester	Credits	Second Semester	Credits
AS.171.101[2]	4	AS.171.102[2]	4
AS.173.111	1	AS.173.112	1
EN.601.226	4	EN.601.229	3
Math Elective	4	Math Elective	4
Writing Course	3	Writing Course	3
	16		**15**

Third Year

First Semester	Credits	Second Semester	Credits
EN.601.433	3	Computer Science Upper Level	3
Computer Science Upper Level	3	Writing Course	3
Humanities/Social Science Course	3	Humanities/Social Science Course	3
Foreign Language I	4	Foreign Language II	4
Electives	2	Electives	2
	15		**15**

Fourth Year

First Semester	Credits	Second Semester	Credits
Computer Science Upper Level	3	Computer Science Upper Level	3
Humanities/Social Science Course	3	Humanities/Social Science Course Upper Level	3
Humanities/Social Science Course Upper Level	3	Elective	3
Elective	3	Elective	3
Elective	2	Elective	3
	14		**15**

Total Credits 120-122

(1) At least one writing course must be chosen from an approved list. You can find the list here (https://www.cs.jhu.edu/academic-programs/undergraduate-studies/undergraduate-academics/undergraduate-academic-advising-manual-2021/) under the "Liberal Art Courses" section.

(2) Students must take two semesters of core science courses, but this can be any combination of Physics, Chemistry, or Biology with their associated labs.