Computer Sciences at the University of Wisconsin-Madison

Academics

“The needs of disparate fields like astronomy and history can drive advances in computer, data, and information sciences. Our core principle is that these disciplines are inseparable from the natural and social sciences and humanities.”

ERIC WILCOTS, ASSOCIATE DEAN

1,820 Computer Sciences majors in fall 2019

#13 for Computer Science in US News & World Report Rankings

Most students finish the degree within four years
Bachelor of Arts or Bachelor of Science?
Students can choose either a Bachelor of Arts (BA) or Bachelor of Science (BS) degree. There is no recommendation or preference - students are encouraged to choose based on the classes they are most interested in taking.

University General Education Requirements
These five courses are required for all UW undergraduates, regardless of school or college.

- **Communications Parts A and B:** Communications Part A is taken within the first year and is a typical freshman speech or composition course. Communications Part B courses are found in a variety of departments, including Sociology, Geography, Communication Arts, etc.
- **Quantitative Reasoning Parts A and B:** Computer Sciences majors will meet this requirement with the Math coursework required for the major and do not need to take additional coursework.
- **Ethnic Studies:** Ethnic studies courses study the experiences of underrepresented populations in the United States. These courses are found in departments such as History, African American Studies, Asian American Studies, Gender & Women’s Studies, among others.

Math Requirement
While the math requirement differs for the BA and the BS, students majoring in Computer Sciences will naturally meet this requirement with the coursework required for the major.

World Language Requirement
- **BA:** The BA requires students to either complete the fourth level of a single language or three levels of one language plus two levels of a different language.
- **BS:** The BS requires the third level of a single language.
A "level" is either one full year in high school, or a semester of college. UW Madison offers around 40 different world languages each semester.

Breadth Requirements
Students need 12 credits in each of the following categories:

- **Humanities/Literature:** Humanities covers the man-made arts & ideas as well as cultural studies. These courses are found in Art History, Religious Studies, Linguistics, Philosophy, etc.
- **Social Sciences:** Social sciences are the study of people from a scientific perspective. Economics, Psychology, Political Science, and International Studies are all social sciences.
- **Natural Sciences:** these courses study the world around us. This includes Botany, Physics, Mathematics, Astronomy, Nutritional Sciences, etc.
  - **BA:** students need 3 credits Biological, 3 credits Physical, and 6 credits any kind of science.
  - **BS:** students need 6 credits Biological and 6 credits Physical science.

For more information, see guide.wisc.edu
Foundational Courses
These courses are required for all Computer Sciences majors:

- **CS 200, 300, and 400**: three-semester, Java-based programming sequence. While CS 200 is not required for the major, it is a pre-req to CS 300. These courses cover topics from the basics of Java programming through Data Structures.
- **CS 252 and 354**: two-semester sequence that focuses on computer architecture and machine organization.
- **CS 240**: this discrete math course covers the mathematical foundations on the field.

Mathematics Requirement
There are four required math courses, besides CS/Math 240:

- **Calculus I and Calculus II** are required
- After Calculus II, students must take two additional math courses. There is a long list of options, but the two most common courses are Linear Algebra and Stats for Engineers.

Advanced Courses
There are six required courses in 4 categories:

- One course in **Theory**. The most common option is CS 577: Algorithms.
- Two **Software/Hardware** courses. These courses include Operating Systems, Databases, and Compilers, along others. They tend to be the most programming-heavy courses in the program.
- One **Applications** course. These courses are varied, but include topics such as Artificial Intelligence, Optimization, Numerical Methods, and Computer Graphics. This category is a blend of programming and math-based courses.
- Two **Electives**. Electives are advanced level courses in the major the student hasn’t already taken yet.

How to declare Computer Sciences
The CS major is a declaration major, meaning there is no application. Students who meet the minimum declaration requirements can declare CS as their major - there is not additional application or review.

To declare, students who have to complete Programming II (CS 300) and Calculus II (Math 222). They need a minimum grade of BC in CS 300 and a minimum GPA of 2.25 between CS 300 and Math 222.

Students who transfer in these courses will work with an advisor to identify courses they can take on campus to be eligible to declare.
Sample 4-Year Plan

**FIRST YEAR**
- CS 200: Programming I
- CS 304: Wisconsin Emerging Scholars (optional companion course)
- Math 221: Calculus I
- CS 300: Programming II
- CS 252: Computer Engineering
- Math 222: Calculus II

**SECOND YEAR**
- CS 400: Programming III
- CS 240: Discrete Math
- CS 354: Machine Organization & Programming
- Additional Math (Math 340: Linear Algebra recommended)

**THIRD YEAR**
- CS Theory (CS 577: Algorithms recommended)
- Additional Math (Stats 324: Stats for Engineers recommended)
- CS Applications
- CS Elective

**FOURTH YEAR**
- CS Software/Hardware
- CS Elective
- CS Software/Hardware

**AP & IB Information**
- **AP Computer Science Principles**: 4 or higher = CS 202
- **AP Computer Science A**: 3 or higher - CS 200
- **AP Calculus AB/AB subscore**: 4 or higher = Math 221
- **AP Calculus BC**: 4 or higher = Math 221 + Math 222
- **IB Computer Science**: 4 or higher = CS 200
- **IB Math**: 4 or higher = Math 221
- **IB Math with Further Math**: 4 or higher = Math 221 + Math 222