

# COMPUTER SCIENCE

College of Engineering and Mines  
Department of Computer Science  
907-474-2777  
[www.cs.uaf.edu](http://www.cs.uaf.edu)

## B.S., B.S./M.S. Degrees

Minimum Requirements for Degrees: B.S.: 120 credits;  
B.S./M.S.: 141 credits

Computer science is the study of information handling and its application to the problems of the world. Computing is widely used in support of science, engineering, business, law, medicine, education and the social sciences, and offers abundant employment opportunities.

The B.S. and M.S. degrees follow the recommendations of the Association for Computing Machinery and the Institute for Electrical and Electronic Engineers. The B.S. degree is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology.

The computer science undergraduate program introduces the fundamentals of computer programming, hardware and theory. It emphasizes the application of general principles to real-world problems. Mathematics and engineering play critical roles in the core. A solid background in fundamentals enables graduates to understand the uses of today's computers and to participate in future developments.

### Major — B.S. Degree

1. Complete the general university requirements. (See page 151. As part of the core curriculum requirements, complete: MATH F251X\* and any approved ethics course.)
2. Complete the B.S. degree requirements. (See page 151. As part of the B.S. degree requirements, complete: MATH F252X\*, PHYS F211X\* and PHYS F212X\*.)
3. Complete the following:\*  
MATH F253X—Calculus III.....4  
MATH F307—Discrete Mathematics.....3  
STAT F300—Statistics.....3
4. Complete one of the following:\*  
MATH F302—Differential Equations.....3  
MATH F310—Numerical Analysis.....3  
MATH F314—Linear Algebra.....3  
MATH F371—Probability.....3  
MATH F405W—Abstract Algebra.....3  
MATH F408—Mathematical Statistics.....3  
MATH F460—Mathematical Modeling.....3
5. Complete the following program (major) requirements:\*  
CS F201—Computer Science I.....3  
CS F202—Computer Science II.....3  
CS F301—Assembly Language Programming.....3  
CS F311—Data Structures and Algorithms.....3  
CS F321—Operating System.....3  
CS F331—Programming Languages.....3  
CS F371—Computer Ethics and Technical Communication.....3  
CS F372—Software Construction.....3  
CS F411—Analysis of Algorithms.....3  
CS F441—Systems Architecture (3)  
or EE F443—Computer Engineering (4).....3-4  
CS F471W—Senior Capstone I.....3  
CS F472W/O—Senior Capstone II.....3  
EE F341—Digital and Computer Analysis and Design.....4  
Electives in computer science at the F300 or F400 level  
or approved electives (such as EE F443).....9
6. Minimum credits required.....120  
\* Students must earn a C- grade or better in each course.

### Major — B.S./M.S. Degree

1. Complete the following admission requirements:
  - a. CS major (junior preferred) or senior standing.
  - b. GPA 3.25 or above based on a minimum of 24 credits. Students must maintain a cumulative GPA of 3.0 to remain in the program.
  - c. Submit a study goal statement.
  - d. Submit a UAF graduate application for admission.
2. Complete the general university requirements. (See page 151. As part of the core curriculum requirements, complete: MATH F251X\* and any approved ethics course.)
3. Complete the B.S. degree requirements. (See page 151. As part of the B.S. degree requirements, complete: MATH F252X\*, PHYS F211X\* and PHYS F212X\*.)
4. Complete the following B.S. program (major) requirements:\*  
CS F201—Computer Science I.....3  
CS F202—Computer Science II.....3  
CS F301—Assembly Language Programming.....3  
CS F311—Data Structures and Algorithms.....3  
CS F321—Operating System.....3  
CS F331—Programming Languages.....3  
CS F371—Computer Ethics and Technical Communication.....3  
CS F372—Software Construction.....3  
CS F411—Analysis of Algorithms.....3  
CS F441—Systems Architecture (3)  
or EE F443—Computer Engineering (4).....3-4  
CS F471W—Senior Capstone I.....3  
CS F472W/O—Senior Capstone II.....3  
EE F341—Digital and Computer Analysis and Design.....4  
MATH F253X—Calculus III.....4  
MATH elective at the F300/F400 level.....3  
MATH F307—Discrete Mathematics.....3  
STAT F300—Statistics.....3
5. Complete the following M.S. program (major) requirements:  
CS F600—Professional Software Development.....4  
CS F601—Algorithms, Architecture and Languages.....4  
CS F690—Graduate Seminar and Project.....3  
CS F691—Graduate Seminar and Project.....3  
CS upper-division/graduate level electives.....3  
CS graduate level electives.....6
6. Pass a written comprehensive exam in computer science theory and practice.
7. Minimum credits required.....141  
\* Students must earn a C- grade or better in each course required for the B.S. degree.  
*Note: For the master's degree, a student must earn an A or B grade in F400-level courses. A grade of C will be accepted in F600-level courses provided a B grade point average is maintained.*  
*Note: This degree program must be completed in seven years or the student will be disqualified from the program. If a student is disqualified, a B.S. in computer science will be awarded if: 1) completed in 10 years, and 2) the student meets the B.S. degree requirements for computer science.*

### Minor

1. Complete the following:\*  
CS F201—Computer Science I.....3  
CS F202—Computer Science II.....3  
Three electives at the F300 or F400 level from CS, EE F341, MATH F310, MATH F460; or electives approved by a computer science advisor  
9
2. Minimum credits required.....15  
\* Students must earn a C- grade or better in each course used to fulfill the minor requirements.  
*Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.*

# Baccalaureate Core Requirements

## Communication . . . . . 9 Credits

- ENGL F111X—Introduction to Academic Writing.....(3)

Complete one of the following:

- ENGL F211X—Academic Writing about Literature.....(3)
- ENGL F213X—Academic Writing about the Social and Natural Sciences.....(3)

Complete one of the following:

- COMM F121X—Introduction to Interpersonal Communication.....(3)
- COMM F131X—Fundamentals of Oral Communication: Group Context.....(3)
- COMM F141X—Fundamentals of Oral Communication: Public Context.....(3)

## Perspectives on the Human Condition . . . . . 18 Credits

Complete all of the following four courses:

- ANTH F100X/SOC F100X—Individual, Society and Culture.....(3)
- ECON F100X or PS F100X—Political Economy.....(3)
- HIST F100X—Modern World History.....(3)
- ENGL/FL F200X—World Literature.....(3)

12

Complete one of the following three courses:

- ART/MUS/THR F200X—Aesthetic Appreciation: Interrelationship of Art, Drama and Music.....(3)
- HUM F201X—Unity in the Arts.....(3)
- ANS F202X—Aesthetic Appreciation of Alaska Native Performance.....(3)

3

Complete one of the following six courses:

- BA F323X—Business Ethics.....(3)
- COMM F300X—Communicating Ethics.....(3)
- JUST F300X—Ethics and Justice.....(3)
- NRM F303X—Environmental Ethics and Actions.....(3)
- PS F300X—Ethics and Society.....(3)
- PHIL F322X—Ethics.....(3)

3

Or complete 12 credits from the above courses plus one of the following:

- Two semester-length courses in a single Alaska Native language or other non-English language
- Three semester-length courses (9 credits) in American Sign Language taken at the university level.

6-9

## Mathematics . . . . . 3 Credits

Complete one of the following:

- MATH F113X—Concepts and Contemporary Applications of Mathematics.....(3)
- MATH F151X—College Algebra for Calculus\*.....(4)
- MATH F152X—Trigonometry.....(3)
- MATH F156X—Precalculus.....(4)
- MATH F122X—Algebra for Business and Economics\*\*.....(3)
- STAT F200X—Elementary Probability and Statistics.....(3)

\* No credit may be earned for more than one of MATH F151X or F122X.

Or complete one of the following:\*

- MATH F251X—Calculus I\*\*.....(4)
- MATH F252X—Calculus II.....(4)
- MATH F253X—Calculus III.....(4)
- MATH F222X—Calculus for Business and Economics.....(4)
- MATH F232X—Calculus for Life Sciences.....(4)

\* Or any math course having one of these as a prerequisite

\*\* No credit may be earned for more than one of MATH F251X, F222X or F232X.

3-4

## Natural Sciences . . . . . 8 Credits

Complete any two (4-credit) courses.

- ATM F101X—Weather and Climate of Alaska.....(4)
- BIOL F100X—Human Biology.....(4)
- BIOL F101X—Introduction to Animal Behavior.....(4)
- BIOL F103X—Biology and Society.....(4)
- BIOL F104X—Natural History.....(4)
- BIOL F115X—Fundamentals of Biology I.....(4)
- BIOL F116X—Fundamentals of Biology II.....(4)
- BIOL F120X—Introduction to Human Nutrition.....(4)
- BIOL F213X—Human Anatomy and Physiology I.....(4)
- BIOL F214X—Human Anatomy and Physiology II.....(4)
- CHEM F100X—Chemistry in Complex Systems.....(4)
- CHEM F103X—Basic General Chemistry.....(4)
- CHEM F104X—Beginnings in Biochemistry.....(4)
- CHEM F105X—General Chemistry.....(4)
- CHEM F106X—General Chemistry.....(4)
- GEOG F111X—Earth and Environment: Elements of Physical Geography.....(4)
- GEOS F100X—Introduction to Earth Science.....(4)
- GEOS F101X—The Dynamic Earth.....(4)
- GEOS F106X—Life and the Age of Dinosaurs.....(4)
- GEOS F112X—History of Earth and Life.....(4)
- GEOS F120X—Glaciers, Earthquakes and Volcanoes.....(4)
- GEOS F125X—Humans, Earth and Environment.....(4)
- MSL F111X—The Oceans.....(4)
- PHYS F102X—Energy and Society.....(4)
- PHYS F103X—College Physics.....(4)
- PHYS F104X—College Physics.....(4)
- PHYS F115X—Physical Science I.....(4)
- PHYS F175X—Astronomy.....(4)
- PHYS F211X—General Physics.....(4)
- PHYS F212X—General Physics.....(4)
- PHYS F213X—Elementary Modern Physics.....(4)

8

## Library and Information Research . . . . . 0-1 Credit

- Successful completion of library skills competency test or LS F100X or LS F101X prior to junior standing

0-1

## Upper-Division Writing and Oral Communication

Complete the following at the upper-division level:

- Two writing intensive courses designated (W) and one oral communication intensive course designated (O), or two oral communication intensive courses designated (O/2) (see degree and/or major requirements)

Total credits required 38-39

All degrees (e.g. B.A., B.S., etc.) require additional courses.

Refer to specific degree and program requirements.

Students must earn a C- grade or better in each course used toward the baccalaureate core.