COMPUTER SCIENCE

College of Engineering and Mines
Department of Computer Science
907-474-2777
www.cs.uaf.edu

BS, BS/MS Degrees

Minimum Requirements for Degrees: BS: 120 credits;
BS/MS: 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 BS and MS degrees follow the recommendations of the Association for Computing Machinery (ACM) and the Institute for Electrical and Electronic Engineers (IEEE). The BS degree is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

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 — BS Degree

1. Complete the general university requirements. (See page 131. As part of the core curriculum requirements, complete: MATH F200X* and any approved ethics course.)

2. Complete the BS degree requirements. (See page 136. As part of the BS degree requirements, complete: MATH F201X*, PHYS F211X* and PHYS F212X*.)

3. Complete the following:*
   MATH F202X—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 — BS/MS 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 GRE (general) scores.
   d. Submit a study goal statement.
   e. Submit a UAF graduate application for admission.

2. Complete the general university requirements. (See page 131. As part of the core curriculum requirements, complete: MATH F200X* and any approved ethics course.)

3. Complete the BS degree requirements. (See page 136. As part of the BS degree requirements, complete: MATH F201X*, PHYS F211X* and PHYS F212X*.)

4. 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 F441—Systems Architecture...3
   CS F471W—Senior Capstone I 3
   CS F472W,O—Senior Capstone II...3
   EE F341—Digital and Computer Analysis and Design 4
   ENGL F314W,O/2—Technical Writing 3
   MATH elective at F300/F400-level 3
   MATH F307—Discrete Mathematics 3
   STAT F300—Statistics 3

5. Complete the following:
   CS F611—Complexity of Algorithms 3
   CS F631—Programming Language Implementation.........................3
   CS F641—Advanced Systems Architecture.............................3
   CS F671—Advanced Software Engineering..............................3
   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 the areas of computer algorithms/theory/complexity, computer architecture, computer language and software engineering.

7. Minimum credits required 141
   * Students must earn a C- grade or better in each course required for the BS degree.
   Note: For the master's degree, a student must earn an A or B grade in F400-level courses. A grade of C (2.0) will be accepted in 600-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 BS in computer science will be awarded if: 1) completed in 10 years, and 2) the student meets the BS degree requirements for computer science with the option of substituting CS F411/F451 for CS F611/F651.

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.

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Baccalaureate Core Requirements

Communication . . . . 9 Credits

- ENGL F111X—Introduction to Academic Writing..(3)
  ENGL F190H may be substituted.

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

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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)

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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 Alaskan Native Performance ....(3)

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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)

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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.

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Mathematics . . . . 3 Credits

Complete one of the following:
- MATH F103X—Concepts and Contemporary Applications of
  Mathematics..(3)
- MATH F107X—Functions for Calculus*..(4)
- MATH F161X—Algebra for Business and Economics**...................................(3)
- STAT F200X—Elementary Probability and Statistics..(3)
  * *No credit may be earned for more than one of MATH F107X or F161X.*

Or complete one of the following:*
- MATH F200X—Calculus I**...(4)
- MATH F201X—Calculus II..(4)
- MATH F202X—Calculus III..(4)
- MATH F262X—Calculus for Business and Economics.....................................(4)
- MATH F272X—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 F200X, F262X or F272.*

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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—Biology of Sex...(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)

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Library and Information Research . . . . 0 – 1 Credit

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

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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.**