

# Computer Science B.S./M.S.

## Program Requirements

Catalog Department Overview # (<https://catalog.uaf.edu/academic-departments/computer-science/>)

## Minimum Requirements for Computer Science B.S./M.S.: 141 credits

Students must earn a C- grade or better in each course.<sup>1</sup>

### General University Requirements

Complete the general university requirements. (<https://catalog.uaf.edu/bachelors/#gurbachelorsdegreestext>)

### General Education Requirements

Complete the general education requirements. 36-40  
(<https://catalog.uaf.edu/bachelors/#generaleducationrequirementsstext>)

As part of the general education requirements, complete the following:

|            |            |
|------------|------------|
| MATH F251X | Calculus I |
|------------|------------|

### B.S. Degree Requirements

Complete the B.S. degree requirements. (<https://catalog.uaf.edu/bachelors/#bachelorofsciencetext>) 16

As part of the B.S. requirements, complete the following:

|            |             |
|------------|-------------|
| MATH F252X | Calculus II |
|------------|-------------|

|            |                   |
|------------|-------------------|
| PHYS F211X | General Physics I |
|------------|-------------------|

|            |                    |
|------------|--------------------|
| PHYS F212X | General Physics II |
|------------|--------------------|

Any approved ethics course

### Undergraduate Computer Science Program Requirements

Complete the following:

|   |   |     |
|---|---|-----|
| CS F201                                 | Computer Science I                          | 3   |
| CS F202                                 | Computer Science II                         | 3   |
| CS F241                                 | Computer Hardware Concepts                  | 4   |
| CS F301                                 | Assembly Language Programming               | 3   |
| CS F311                                 | Data Structures and Algorithms              | 3   |
| CS F321                                 | Operating Systems                           | 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                                 | System Architecture                         | 3-4 |
| or EE F443                              | Computer Engineering Analysis and Design    |     |
| CS F471                                 | Senior Capstone I <sup>2</sup>              | 3   |
| CS F472                                 | Senior Capstone II <sup>2</sup>             | 3   |
| MATH F253X                              | Calculus III                                | 4   |
| MATH F307                               | Discrete Mathematics                        | 3   |
| STAT F300                               | Statistics                                  | 3   |
| MATH elective at the F300 or F400 level |   | 3   |

### Credits

### General University Requirements

Complete the graduate general university requirements. (<https://catalog.uaf.edu/masters/#gurmastersdegreestext>)

### Master's Degree Requirements

Complete the master's degree requirements. (<https://catalog.uaf.edu/masters/#masterofscience>)

### Graduate Computer Science Program Requirements

Complete the following:

|   |  |    |
|---|--|----|
| 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  |
| Approved electives at the F400 or F600 level <sup>3,4</sup> |  | 16 |

### Exam

Pass a comprehensive exam in computer science theory and practice.

### Total Credits

**135-140**

<sup>1</sup> 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.

<sup>2</sup> Fulfills the baccalaureate capstone requirement.

<sup>3</sup> 9 credits maximum at the F400 level.

<sup>4</sup> 9 credits will count towards both graduate and undergraduate requirements from the approved electives at the F400 or F600 level.

**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:

- completed in 10 years, and
- the student meets the B.S. degree requirements for computer science.

## Admission Requirements

Complete the following admission requirements:

- Computer science major, junior standing, with CS F311 completed.
- 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.
- Submit a UAF graduate application for admission.

## Roadmaps

Catalog Department Overview # (<https://catalog.uaf.edu/academic-departments/computer-science/>)

Roadmaps provide suggested semester-by-semester study plans for programs and are based on full-time enrollment, unless otherwise specified.

- This roadmap should be used in conjunction with regular academic advising sessions. All students are encouraged to meet with their advisor or mentor each semester.
- Certain courses and milestones must be completed in the specified semester to ensure on-time graduation.
- Transfer credits may affect the roadmap.
- Requirements, course availability, and sequencing may change.
- Courses marked with (\*) are recommended.

| <b>First Year</b>                           |  |                |
|---|--|----------------|
| <b>Fall</b>                                 | <b>Credits Spring</b>                        | <b>Credits</b> |
| CHEM F105X (*) <sup>7</sup>                 | 4 CHEM F106X (*) <sup>7</sup>                | 4              |
| MATH F251X <sup>6</sup>                     | 4 MATH F252X <sup>6</sup>                    | 4              |
| WR TG F111X <sup>1</sup>                    | 3 General Education Requirement - Arts       | 3              |
| Complete one of the following: <sup>1</sup> | 3 General Education Requirement - Humanities | 3              |
| COM F121X                                   |  |                |
| COM F131X (*)                               |  |                |
| COM F141X (*)                               |  |                |
|   | <b>14</b>                                    | <b>14</b>      |

| <b>Second Year</b>                              |   |                |
|---|---|----------------|
| <b>Fall</b>                                     | <b>Credits Spring</b>                       | <b>Credits</b> |
| CS F201 <sup>20</sup>                           | 3 CS F202 <sup>20</sup>                     | 3              |
| MATH F253X <sup>20</sup>                        | 4 CS F241 <sup>20,25</sup>                  | 4              |
| PHYS F211X <sup>17</sup>                        | 4 LS F101X <sup>15</sup>                    | 1              |
| General Education Requirement - Social Sciences | 3 PHYS F212X <sup>17</sup>                  | 4              |
|   | Complete one of the following: <sup>1</sup> | 3              |
|   | WR TG F211X (*)                             |                |
|   | WR TG F212X                                 |                |
|   | WR TG F213X                                 |                |
|   | WR TG F214X                                 |                |
|   | <b>14</b>                                   | <b>15</b>      |

| <b>Third Year</b>  |   |                |
|--|---|----------------|
| <b>Fall</b>  | <b>Credits Spring</b>                             | <b>Credits</b> |
| CS F301 <sup>20,25</sup>   | 3 CS F321 <sup>20,25</sup>                        | 3              |
| CS F311 <sup>20,25</sup>   | 3 CS F331 <sup>20,25</sup>                        | 3              |
| CS F371 <sup>20,25</sup>   | 3 CS F372 <sup>20,25</sup>                        | 3              |
| STAT F300 <sup>20,25</sup>   | 3 MATH F307 <sup>20</sup>                         | 3              |
| General Education Requirement - Additional Arts, Humanities or Social Sciences | 3 General Education Requirement - Social Sciences | 3              |
|  | <b>15</b>   | <b>15</b>      |

| <b>Fourth Year</b>                           |   |                |
|--|---|----------------|
| <b>Fall</b>                                  | <b>Credits Spring</b>                       | <b>Credits</b> |
| CS F411 <sup>20,25</sup>                     | 3 CS F441 or EE F443 <sup>20,25</sup>       | 3-4            |
| CS F471 <sup>20,21,25</sup>                  | 3 CS F472 <sup>20,21,25</sup>               | 3              |
| Degree Requirement - Ethics - Upper Division | 3 Degree Requirement - Alaska Native-themed | 3              |
| Program Elective - MATH                      | 3 Program Elective - Upper Division         | 3              |
| Program Elective -Upper Division             | 3   |                |
|  | <b>15</b>                                   | <b>12-13</b>   |

| <b>Fifth Year</b>        |                            |                |
|--------------------------|----------------------------|----------------|
| <b>Fall</b>              | <b>Credits Spring</b>      | <b>Credits</b> |
| CS F600 <sup>20,25</sup> | 4 CS F601 <sup>20,25</sup> | 4              |
| CS F690 <sup>20,25</sup> | 3 CS F691 <sup>20,25</sup> | 3              |

|                                   |                                     |           |
|-----------------------------------|-------------------------------------|-----------|
| Program Elective - Upper Division | 3 Program Elective - Upper Division | 4         |
| Program Elective - Upper Division | 3                                   |           |
|                                   | <b>13</b>                           | <b>11</b> |

**Total Credits 138-139****Footnote Definitions**

| <b>General Education Requirements</b>            | <b>Degree Requirements</b>        | <b>Program &amp; Other Requirements</b> |
|--|-----------------------------------|---|
| 1-Communication                                  | 8-Alaska Native-themed            | 20-Program Requirement                  |
| 2-Arts   | 9-Communication                   | 21-Capstone Requirement                 |
| 3-Humanities                                     | 10-Computation                    | 22-Concentration Course                 |
| 4-Social Sciences                                | 11-Ethics                         | 23-General Elective                     |
| 5-Additional Arts, Humanities or Social Sciences | 12-Humanities                     | 24-Minor Course                         |
| 6-Mathematics                                    | 13-Human Relations                | 25-Upper Division                       |
| 7-Natural Sciences                               | 14-Humanities or Social Sciences  | 26-Program Elective                     |
|  | 15-Library & Information Research |   |
|  | 16-Mathematics                    |   |
|  | 17-Natural Sciences               |   |
|  | 18-Other                          |   |
|  | 19-Social Sciences                |   |

**Learning Outcomes**

Catalog Department Overview # (<https://catalog.uaf.edu/academic-departments/computer-science/>)

Program Learning Outcomes are specific, measurable statements that define the knowledge and skills students will gain by the end of the program.

Graduates of this program will be able 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
- Demonstrate knowledge of theoretical foundations and formal methods in computer science
- Demonstrate the ability to communicate effectively both orally and in writing
- Demonstrate the ability to apply their knowledge to practical problems