B.S., BIOLOGICAL SCIENCES WITH CONCENTRATION

Concentrations: Cell and Molecular Biology, Physiology, Ecology and Evolutionary Biology, and Biomedical Science

Minimum Requirements for Degree: 120 credits

Students must earn a C- grade or better in each course.

General University Requirements

Complete the general university requirements. [Link](http://catalog.uaf.edu/bachelors)

General Education Requirements

Complete the general education requirements. [Link](http://catalog.uaf.edu/bachelors/general-education-requirements)

As part of the general education requirements, complete:

- MATH F230X Calculus Essentials with Applications
- or MATH F251X Calculus I
- CHEM F105X General Chemistry I
- and CHEM F106X General Chemistry II

B.S. Degree Requirements

Complete the B.S. degree requirements. [Link](http://catalog.uaf.edu/bachelors/summary-of-bachelors-degree-reqs/#bachelorofsciencetext)

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

- STAT F200X Elementary Probability and Statistics
- or STAT F300 Statistics
- BIOL F115X Fundamentals of Biology I
- BIOL F116X Fundamentals of Biology II

Program Requirements

BIOL F260 Principles of Genetics 4
Select one from the following four options: 4-8

- BIOL F310 Animal Physiology
- BIOL F434 Structure and Function of Vascular Plants
- BIOL F342 Microbiology
- BIOL F213X and BIOL F214X Human Anatomy and Physiology I and Human Anatomy and Physiology II
- BIOL F481 Principles of Evolution 4
- CHEM F321 Organic Chemistry I 4
- CHEM F325 Organic Chemistry II 3-4
- or CHEM F351 General Biochemistry: Metabolism
- PHYS F103X College Physics I 4
- or PHYS F211X General Physics I
- PHYS F104X College Physics II 3-4
- or PHYS F212X General Physics II
- or CS F103 Introduction to Computer Programming
- or CS F201 Computer Science I

Concentration

Select one from the following concentrations: 1 21-28

- Cell and Molecular Biology
- Physiology
- Ecology and Evolutionary Biology

Biomedical Science

Capstone 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL F400</td>
<td>Capstone Project</td>
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Satisfactory completion of a capstone research project which can be done either working individually with a faculty member or within one of the following courses: 3, 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL F434</td>
<td>Structure and Function of Vascular Plants</td>
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<tr>
<td>BIOL F441</td>
<td>Animal Behavior</td>
<td></td>
</tr>
<tr>
<td>BIOL F466</td>
<td>Advanced Cell and Molecular Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL F472</td>
<td>Community Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL F473</td>
<td>Limnology</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 47-64

1. BIOL F397, BIOL F497, BIOL F490, URSA F388 or URSA F488 courses may be substituted by petition for a maximum of two required elective courses in biology (3-4 credits of independent study or research per substituted course). The subject area of the independent study or research will determine which biological subject areas the credits satisfy.

2. Fulfills the baccalaureate capstone requirement.

3. Students working individually with a faculty member may, for example, take BIOL F490, BIOL F497 or do so without course credits.

4. Capstone courses may be double counted as electives.

Note: A foreign language is encouraged by the department to meet the general education requirements.

Concentrations

CELL AND MOLECULAR BIOLOGY

As part of the program requirements above, complete:

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM F325</td>
<td>Organic Chemistry II</td>
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</table>

Complete the following (at least one of which must satisfy the W requirement):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL F360</td>
<td>Cell and Molecular Biology</td>
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</tr>
<tr>
<td>CHEM F450</td>
<td>General Biochemistry: Macromolecules</td>
<td>3</td>
</tr>
<tr>
<td>CHEM F351</td>
<td>General Biochemistry: Metabolism</td>
<td>3</td>
</tr>
</tbody>
</table>

Cell and Molecular and Physiology Electives

Select one additional course from list A. 3-4
Select two additional courses from lists A or B. 6-8

Biology Breadth Elective

Select one additional course from lists C or D 3-4

Total Credits 21-25

PHYSIOLOGY

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<tbody>
<tr>
<td>BIOL F360</td>
<td>Cell and Molecular Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

Physiology or Cell and Molecular Biology Electives

Select two additional courses from list B. 6-8
Select two additional courses from lists A or B. 6-8

Biology Breadth Elective

Select one additional course from lists C or D 3-4

Biology Elective
Select one additional course from lists A, B, C, D, or E  3-4

Total Credits  21-27

ECOLOGY AND EVOLUTIONARY BIOLOGY
BIOL F371  Principles of Ecology  4

Ecology and Evolutionary Biology Electives
Select two additional courses from list C  6-8

Organismal Elective
Select one additional course from list D  3-4

Biology Breadth Elective
Select one additional course from lists A, B, or E  3-4

Biology Elective
Select one additional course from lists A, B, C, D, or E  3-4
STAT F401  Regression and Analysis of Variance  3-4
or STAT F402  Scientific Sampling  3-4

Total Credits  22-28

BIOMEDICAL SCIENCE
As part of the general education requirements the following are recommended:

PSY F101X  Introduction to Psychology
SOC F101X  Introduction to Sociology
ECON F100X  Political Economy
or ECON F201X  Principles of Economics I: Microeconomics
or ECON F202X  Principles of Economics II: Macroeconomics

Complete the following as part of the program requirements:

BIOL F213X  Human Anatomy and Physiology I
and BIOL F214X  and Human Anatomy and Physiology II
or BIOL F310  Animal Physiology

CHEM F325  Organic Chemistry II

PHYS F104X  College Physics II
or PHYS F212X  General Physics II

Complete the following:

BIOL F342  Microbiology  4
BIOL F360  Cell and Molecular Biology  3
CHEM F351  General Biochemistry: Metabolism  3

Biology Breadth Electives
Select one additional course from lists C or D  3-4

Biomedical Electives
Select at least three additional courses from list E  9-12

Total Credits  22-26

Biology Elective Course Lists
Courses that satisfy upper-division elective credit may require prerequisites.

LIST A - CELL AND MOLECULAR BIOLOGY
BIOL F342  Microbiology  4
BIOL F360  Cell and Molecular Biology  3
BIOL F417  Neurobiology  3
BIOL F435  Introduction to Biology of Cancer  3
BIOL F460  Principles of Virology  3
BIOL F462  Infectious Diseases  3

BIOL F465  Immunology  3
BIOL F466  Advanced Cell and Molecular Laboratory  3

CHEM F325  Organic Chemistry II  4
CHEM F351  General Biochemistry: Metabolism  3
CHEM F450  General Biochemistry: Macromolecules  3
CHEM F470  Cellular and Molecular Neuroscience  3
CHEM F474  Neurochemistry  3

LIST B - PHYSIOLOGY
BIOL F310  Animal Physiology  4
BIOL F312  Medical Physiology  3
BIOL F335  Principles of Epidemiology  3
BIOL F342  Microbiology  4
BIOL F412  Exercise Physiology  3
BIOL F417  Neurobiology  3
BIOL F434  Structure and Function of Vascular Plants  4

BIOL F441  Animal Behavior  3
BIOL F455  Environmental Toxicology  3
BIOL F457  Environmental Microbiology  3
BIOL F462  Infectious Diseases  3
BIOL F465  Immunology  3

LIST C - ECOLOGY AND EVOLUTIONARY BIOLOGY
BIOL F371  Principles of Ecology  4
BIOL F418  Biogeography  3
BIOL F433  Conservation Genetics  3
BIOL F441  Animal Behavior  3
BIOL F457  Environmental Microbiology  3
BIOL F469  Landscape Ecology and Wildlife Habitat  3
BIOL F471  Population Ecology  3
BIOL F472  Community Ecology  3
BIOL F473  Limnology  3
BIOL F476  Ecosystem Ecology  3
BIOL F483  Stream Ecology  3

BIOL F485  Global Change Biology  3
BIOL F486  Vertebrate Paleontology  3
BIOL F487  Conceptual Issues in Evolutionary Biology  3
BIOL F488  Arctic Vegetation Ecology: Geobotany  3
BIOL F489  Vegetation Description and Analysis  3
WLF F301  Design of Wildlife Studies  3

LIST D - ORGANISMAL BIOLOGY
BIOL F239  Introduction to Plant Biology  4
BIOL F301  Biology of Fishes  4
BIOL F305  Invertebrate Zoology  4
BIOL F331  Systematic Botany  4
BIOL F406  Entomology  4
BIOL F418  Biogeography  3
BIOL F425  Mammalogy  3
BIOL F426  Ornithology  3
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BIOL F427</td>
<td>Ichthyology</td>
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<tr>
<td>BIOL F486</td>
<td>Vertebrate Paleontology</td>
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<tr>
<td>BIOL F489</td>
<td>Vegetation Description and Analysis</td>
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**LIST E - BIOMEDICAL SCIENCE**

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<td>Principles of Epidemiology</td>
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</tr>
<tr>
<td>BIOL F402</td>
<td>Biomedical and Research Ethics</td>
<td>3</td>
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<td>BIOL F412</td>
<td>Exercise Physiology</td>
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<td>Neurochemistry</td>
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</tr>
<tr>
<td>WLF F305</td>
<td>Wildlife Diseases</td>
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