



# UNIVERSITY of ALASKA SOUTHEAST

Bachelor of Arts Biology  
Bachelor of Science Biology  
Bachelor of Science Marine Biology  
Bachelor of Science Fisheries and Ocean Sciences with a Concentration in Fisheries Science  
Annual Assessment Report for AY22  
March 2023

## **Program Overview**

The cluster of biology programs includes a B.S. degree in Biology, a B.A. degree in Biology, a B.S. degree in Marine Biology, a B.S. degree in Fisheries and Ocean Sciences with a Concentration in Fisheries Science that is jointly offered with UAF, pre-major programs for all of the above, a minor in Biology, a minor in Chemistry, and a concentration in Fisheries Science available to the first three of the aforementioned bachelor programs. The location of the University provides students with a “natural laboratory” that includes extensive marine habitat, rainforest, streams, lakes, wetlands, and ice fields all within walking or short driving distance of the classrooms. A small student-to-professor ratio ensures a more personal approach to learning than is possible at larger universities. Information about our degrees is found at <http://www.uas.alaska.edu/artssciences/naturalsciences/biology/index.html>.

The B.S. in Marine Biology was instituted in AY05 in support of the university’s goal of being the premier in-state campus for marine science undergraduate programs. The B.A. in Biology was added in AY08 to provide a greater opportunity for students interested in a biology degree with a liberal arts focus. The B.A. degree is ideal for students with goals towards teaching in middle-school and secondary-schools and require a content degree in addition to broad training in liberal arts and sciences. The B.A. in Biology was derived from the B.S. in Biology program and no new courses were required to implement the program. The B.S. degree in Fisheries and Ocean Sciences and the Concentration in Fisheries commenced in AY18.

*B.S. Degree – Biology:* The Bachelor of Science degree in Biology provides students the opportunity to learn biological principles and skills in lecture, laboratory, and field courses. Student research is emphasized throughout the program. Program faculty are actively involved in a wide range of disciplines, including biological and fisheries oceanography, marine ecology, behavioral ecology, evolution, marine mammalogy, invertebrate physiology, and pollution biology. The Bachelor of Science program in biology comprises a core curriculum generally found nationwide in Bachelor of Science biology programs.

*B.S. Degree – Marine Biology:* The B.S. degree in Marine Biology provides students with the opportunity to learn biological principles and skills in lecture, laboratory and field courses with a core curriculum in marine biology. Student research is emphasized throughout the program. The program

has faculty actively involved in a wide range of disciplines described above. The Marine Biology B.S is enhanced by the onsite flow-through seawater system located on the main campus, and intertidal field sites for students directly behind the teaching lab. There are few campuses that can boast of the connection between a marine laboratory and the main campus!

*B.S. Degree – Fisheries and Ocean Science with a Concentration in Fisheries:*

The UAS-UAF Joint B.S. degree in Fisheries and Ocean Sciences with a concentration in Fisheries Sciences (Fisheries B.S.) provides students with the opportunity to learn fisheries and ocean sciences and skills in lecture, laboratory and field courses with a core curriculum in fisheries science across the two campuses. Student internships in fisheries industries and fisheries science research is emphasized throughout the program. Students enjoy designing their upper-division elective coursework from many options offered through UAS Natural Sciences and UAF College of Fisheries and Ocean Sciences. The program has faculty actively involved in a wide range of disciplines described above. The Fisheries B.S is enhanced by the onsite flow-through seawater system located on the main campus, and intertidal and subtidal field sites for students directly behind the teaching lab. There are few campuses that can boast of the connection between a marine laboratory and the main campus!

*B.A. Degree – Biology:* The B.A. degree in Biology provides students with the opportunity to learn biological principles and skills in lecture, laboratory and field courses with a breadth in liberal arts and sciences.

*Biology Minor:* This minor is designed to provide students with a broad introduction to the discipline of biology as well as the opportunity for advanced study in three focus areas.

*Chemistry Minor:* This minor is designed to provide students with a broad introduction to the discipline of chemistry as well as the opportunity for advanced study in specific focus areas.

*Fisheries Science Concentration:* This concentration is designed for students in one of the cluster of biology programs to gain a broad introduction to the biology, assessment, and management of fish populations harvested for human consumption, in preparation for a career in the fisheries of Alaska and elsewhere.

**Program Student Learning Outcomes**

The following program student learning outcomes are based on our Program Assessment Plan that was finalized in fall 2017. The student learning outcomes are common to all four degree programs.

Program Student Learning Outcomes (SLOs)

- 1) Students will gain a broad background in biological sciences.
- 2) Students will develop critical thinking skills.
- 3) Students will improve oral and written scientific communication skills.
- 4) Students will gain practical experiences in basic biological research.

**Method of Data Collection on Program SLOs**

SLO 1: Broad Background in Biological Sciences: Students will demonstrate a broad knowledge of biology including chemical principles, cellular metabolisms, organismal diversity, principles of genetics and evolution

1.1) We report on the percentage of students who passed (earned a C or better) the first (BIOL 115) and second (BIOL 116) semester of the Fundamentals of Biology two course series. We compare this across years.

1.2) We examine the distribution of grades in one lower-division required course (BIOL S271) and one upper-division required course (BIOL S362) to determine the percentage of students who pass with a C or better. We compare this across years.

SLO 2: Develop Critical Thinking Skills. Students will demonstrate that they can use an empirical approach to evaluate a biological phenomenon using the primary literature.

2.1) We assess the percentage of students in a lower division course (BIOL S271) who receive a C, B, or A on their written research report. We compare these data to those obtained from two upper division courses (BIOL S362 and BIOL S384).

2.2) We assess the proportion of students earning a C or better for the portion of the grade based on the primary literature (e.g., discussion grade, written research paper) in one lower-division course (BIOL S110) and two upper-division courses (BIOL S311, S380).

2.3) We assess the percentage of students in a lower division course (BIOL S271) who earn a C, B, or A on their written report that requires them to use the scientific method to solve scientific problems in the field and lab. We compare these data to those obtained from an upper division course (BIOL S362).

SLO 3: Oral & Written Scientific Communication Skills. Students will demonstrate that they are able to represent and communicate biological information.

3.1) We assess the percentage of students in a lower division course (BIOL S215) who receive a C, B, or A on their oral presentation. We compare these data to that obtained from an upper division course (BIOL S384).

3.2) We assess the percentage of students in a lower division course (BIOL S115) who earn a C, B, or A on their written research paper. We compare these data to that obtained from an upper division course (BIOL S380).

3.3) We assess the percentage of students in a lower division course (CHEM S105) who earn a C, B, or A on their written lab notebook. We compare these data to that obtained from an upper division course (CHEM S341).

SLO 4: Students will gain practical experiences in basic biological research. Students will demonstrate their knowledge of techniques and skills gained in the biological sciences.

4.1) We assess the percentage of students who receive a C, B, or A on the laboratory practical in a lower division course (BIOL 116) and an upper-division course (CHEM 342).

**Data Collected on Program SLOs for AY21** The following program student learning outcomes data summary table is based on our Program Assessment Plan that was finalized in Fall 2017, and includes data for AY22.

<b>SLO</b>	<b>Course</b>	<b>Metric</b>	<b>%</b>
1.1	BIOL S115	% students earning a C or better	72
1.1	BIOL S116	% students earning a C or better	82
1.2	BIOL S271	% students earning a C or better	80
1.2	BIOL 310	% students earning a C or better	87
1.2	BIOL S362	% of students earning a C or better	93
2.1	BIOL S271	% students earning a C or better on their written research paper	92
2.1	BIOL S362	% students earning a C or better on their written research paper	100
2.2	BIOL S110	% of students earning a C or better for the portion of the grade based on the primary literature (discussion grade)	100
2.2	BIOL S375	% of students earning a C or better for the portion of the grade based on the primary literature (discussion grade)	67
2.2	BIOL S405	% of students earning a C or better for the portion of the grade based on the primary literature (written research paper)	81
2.3	BIOL S115	% of students earning a C or better on their written report that requires them to use the scientific method to solve scientific problems in the field and lab	78
2.3	BIOL S427	% of students earning a C or better on their written report that requires them to use the scientific method to solve scientific problems in the field and lab	93
3.1	BIOL S215	% of students earning a C or better on their oral presentation	100
3.1	BIOL S384	% of students earning a C or better on their oral presentation	100
3.1	BIOL S427	% of students earning a C or better on their oral presentation	100
3.2	BIOL S110	% students earning a C or better on their written research paper	100
3.2	BIOL S384	% students earning a C or better on their written research report	85
3.3	CHEM S106	% of students earning a C or better on their written lab notebook	55
3.3	CHEM S321	% of students earning a C or better on their written lab notebook	80
4.1	BIOL S116	% of students earning a C or better on the laboratory practical	81
4.1	CHEM S321	% of students earning a C or better on the laboratory practical	80

## **Evaluation of the Data Collected on Program SLOs for AY22**

On average, 86% of students achieved the SLO's for the Biology, Marine Biology, and Fisheries programs. While this is a slight decrease from AY21 (90%), it still strongly indicates that our program is effective at meeting the SLO's outlined in this plan. Students performed well on nearly all SLOs and performed particularly well on oral presentation skills (SLO 3.1), with 100% of students earning a C or better in the three courses (BIOL S215, 384, 427) that assessed this. Students were somewhat weaker on written lab reports (SLO 2.3) and written lab notebooks (SLO 3.3) in lower-division courses; however, there was improvement in these same SLOs in the upper-division courses (SLO 2.3 78% vs. 93%, SLO 3.3 55% vs. 80%), indicating academic growth in our students through time. Similarly, there was strong improvement in achieving SLO 1.1 between the first (BIOL S115, 72%) and second (BIOL S116, 82%) second semester introductory biology course, and SLO 1.2 between the lower-division (BIOL S271, 80%) and upper-division (BIOL S310, 87%; BIOL S362, 93%) courses, again indicating continued academic growth in our students. Finally, we note that these SLOs do not include BIOL S498, where upper-division students gain most of their practical skills through internships and independent research.

## **Tutoring**

During AY22, term Assistant Professor JoMarie Alba maintained consistent tutoring hours in the Learning Center (TLC) and the Native and Rural Student Center (NRSC). Consistently, there were about three students who would visit her at TLC and three students at the NRSC. It is estimated that she worked with at least 20 students total over the entire academic year, translating to more than 100 visits from students over the year. Having a dedicated BIOL tutor that can serve TLC and the NRSC is valuable to our students and program, and something we would like to continue to do.

## **New Program Additions**

The Chemistry minor was approved during AY22 for implementation during AY23. This is an important addition to our programs and will offer a pathway for students interested in focused study of chemistry beyond general chemistry. Student feedback about this new minor has been quite enthusiastic.

## **Student Exit Interviews**

We typically distribute exit interviews to our graduating seniors each spring. We sent out these interviews by email in April 2022 and received no responses. We have had better success in the past hand-delivering the surveys to students during class, so we will go back to that approach in Spring 2023.

## **Future Plans to Improve Student Learning**

Faculty have discussed ways in which student learning can be improved. One of the more successful strategies for this has been the receipt of curriculum development and academic innovation funds to increase the proportion of active learning and locally based lab activities in our courses. We will continue to apply for such funds.

We also know from student discussions that students who engage in research (independent or directed) are more engaged in biology. In response to this, David Tallmon proposed, developed and organized a

freshman course (BIOL S108: Ecology of Southeast Alaska: Experiential Learning) in which students gain skills in time management, note taking, reading primary literature, and are introduced to all Biology faculty and their research projects. This was delivered for the time to students in Fall 2019 and has consistently earned high enrollment and positive feedback from the students. All Biology faculty have participated in this course by leading weekend research activities, finding it overall to be a positive experience with freshmen in field and laboratory settings. This experience helps to 'break the ice' for students meeting and working with faculty, and our hope is that they become more engaged in faculty research projects as a result.

In addition, the co-location of biology students in Anderson adjacent to Biology faculty offices provides positive student-student and student-faculty interactions. Students study in impromptu groups in the "Fish Bowl" and this is an effective mechanism for fostering positive study habits and student learning. This face-to-face engagement halted during the pandemic but resumed during AY21-22, which we were all happy to see.

Finally, Biology faculty have been working with Dean Silkaitis on visioning and growth of our programs. We have written for federal appropriations funds and will continue to work together to secure resources to transform the Anderson building into a certified marine lab and obtain a vessel dedicated to teaching and research. This will further strengthen our nationally-acclaimed marine biology program situated in the incredible environment of Southeast Alaska, helping us to be one of the top undergraduate marine biology programs in the nation.