



UNIVERSITY of ALASKA SOUTHEAST

Bachelor of Arts Biology
Bachelor of Science Biology
Bachelor of Science Marine Biology
Annual Assessment Report for AY2019
March 6, 2020

Program Overview

The cluster of biology programs includes a BS degree in Biology, a BA degree in Biology, a BS degree in Marine Biology, pre-major programs for all of the above, a minor in Biology, and a concentration in Fisheries Science available to all three 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. Our new concentration in Fisheries Science was recently developed and is available in the UAS Student Catalog in AY18.

BS 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 marine ecology, behavioral ecology, evolution, marine mammalogy, crustacean physiology, algal physiological ecology, and pollution biology. The Bachelor of Science program in biology comprises a core curriculum generally found nationwide in Bachelor of Science biology programs.

BS 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!

BA 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.

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 three 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

1A) We report on the number of students out of the total number of students who passed (earned a C or better) the Fundamentals of Biology two course series (BIOL S105 and 106).

1B) We examine the distribution of grades in three required courses (BIOL S271, 310, 362) to determine the percentage of students who pass with a C or better.

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.

2A) 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 an upper division course (BIOL S384).

2B) 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 upper-division course (BIOL S380).

2C) 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 S384).

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

3A) We assess the percentage of students in a lower division course (BIOLS215) 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).

3B) We assess the percentage of students in a lower division course (BIOL S271) 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 S384).

3C) 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 will 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.

We assess the percentage of students who receive a C, B, or A on the laboratory practical in a lower division course (BIOL 105) and two upper-division courses (BIOL S310, CHEM 342).

Data Collected on Program SLOs for AY19The following program student learning outcomes data summary is based on our Program Assessment Plan that was finalized in fall 2017, and includes data for AY19.

SLO	Course	Metric	% (total enrollment)
1A	BIOL S105	# of students out of the total number of students who passed (earned a C or better)	73.4% (33/45)
1A	BIOL S106	% students who passed (earned a C or better)	88% (22/25)
1B	BIOL S271	% students earning an A, B, or C	83% (24/29)
1B	BIOL S310	% of students earning a C or higher	87.5% (21/24)
1B	BIOL S362	% of students earning a C or higher	96% (24/25)
2A, 3B	BIOL S271	% students earning an A, B, or C on their written research report	69% (20/29)
2A, 3B	BIOL S384	% students earning C or better on their written research report	100% (7/7)
2B	BIOL S380	% of students earning a C or better for the portion of the grade based on the primary literature (e.g., discussion grade)	Course not offered
2C	BIOL S271	% of students earning A, B, or C on their written report that requires them to use the scientific method to solve scientific problems in the field and lab.	69% (20/29)
2C	BIOL S384	% 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.	100% (7/7)
3A	BIOL S215	% of students earning an A, B, or C on their oral presentation.	100% (16/16)
3A	BIOL S384	% of students earning a C or better on their oral presentation.	N/A

3C	CHEM S105	% of students earning C or better on their written lab notebook	83.8% (31/37)
3C	CHEM S341	% of students earning a C or better on their written lab notebook	85.7% (13/15)
4A	BIOL S106	% of students earning a C or better on the laboratory practical	88 % (22/25)
4A	BIOL S310	% of students earning an C or better on the laboratory practical	91.7% (22/24)
4A	CHEM S342	% of students earning a C or better on the laboratory practical	N/A

Evaluation of the Data Collected on Program SLOs for AY19

On average, more than 85% of students achieved the SLOs for the Biology and Marine Biology programs (AY18, 82.1%). This indicates that our program is largely effective at meeting the SLO's outlined in this plan. Students showed particular strengths in their broad background in biological sciences (SLO1), and oral and written scientific communication skills (SLO3), with the highest percentage of students getting high marks in oral presentations. Students were weakest in meeting SLO2 related to writing scientific skills. These SLOs do not include BIOL 492/498, where senior students gain most of their practical skills through internships and independent research.

Future Plans to Improve Student Learning

Faculty have discussed ways in which SLOs can be improved, and we have created a one credit recitation class to accompany the first semester Fundamentals of Biology course BIOL 105 and to provide additional learning opportunities for student who seek them. We are also working with our Teaching Assistants to work more closely with freshmen biology students. To this end, we are requiring that Teaching Assistants spend more time at the end of lab in a discussion session. In the past few years, we have also obtained curriculum development and academic innovation funds to increase the proportion of active learning and locally based lab activities in our courses.

We know from exit interviews and student discussions that students who engage in research (independent or directed) are more engaged in biology. David Tallmon proposed, developed and organized a freshman course (Biology 108: Ecology of SE Alaska: Experiential Learning) in which students gain skills in time management, note taking, reading primary literature, and will be introduced to all Biology faculty and their research projects. This was first delivered to students in fall 2018 and we received positive feedback from the students. We are eager to see if this has positive impacts on success and retention in the biology programs over the next few years. All biology faculty participated in this and found it overall to be a positive experience in the field and laboratory with freshmen students. This experience helped 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.

We have determined that many of our students do not form study groups in their classes and we are testing ways to encourage participation in study groups. The co-location of biology students in Anderson with Biology faculty provides positive student and student/faculty interactions. Students study in the "Fish Bowl", adjacent to faculty offices, and foster positive study habits. Faculty frequently discuss study skills with students, both in class and during advising sessions, and study groups are encouraged.

With respect to improving practical skills in biology, we emphasize how particular skills can be applied to research/science projects and to future careers. We already provide the time for the students to understand and practice laboratory skills. Students bear some responsibility for understanding

practical skills prior to their laboratory practicals. Students gain significant experience in laboratory and field techniques while conducting independent or directed research with faculty mentors, which is not captured in our SLOs, so perhaps we should modify our assessment tool to include this metric.

We are particularly proud of our Marine Biology BS Program being ranked #8 in the country by College Magazine in 2018, and glad to hear that our efforts in delivering a quality program are being recognized.