

A.S. Natural Science (NSCI)



2019

ANNUAL REPORT OF PROGRAM DATA



UNIVERSITY of HAWAII®
HAWAII
COMMUNITY COLLEGE

1. Program Description

Statement and brief description of the program including a listing of the program level Student Learning Outcomes (SLOs).

This Associate in Science Degree program prepares students to transfer to 4-year institutions in STEM (Science, Technology, Engineering and Mathematics) related fields. Hawaii Community College offers two ASNS tracks: Biological Science and Physical Science.

The Program Student Learning Outcomes (PLOs) are:

1. Analyze data effectively using current technology
2. Communicate scientific ideas and principles clearly and effectively
3. Analyze and apply fundamental mathematical, physical, and chemical concepts and techniques to scientific issues
4. Apply fundamental concepts and techniques in their chosen concentration

2. Analysis of the Program

Strengths and weaknesses in terms of demand, efficiency, and effectiveness based on an analysis of the Quantitative Indicators. CTE programs must include an analysis of Perkins Core indicators for which the program did not meet the performance level. Include Significant Program Actions (new certificates, stop outs, gain/loss of positions, results of prior year's action plan).

Overall, the Natural Science Program is "Cautionary."

Our Demand health is "Unhealthy" due to the overall drop in enrollment from 2017-18 to the report year. Enrollment has been dropping across the System and the 8% drop in the ASNS reflects the 8% drop in the Liberal Arts program. Because the ASNS is a small program, the 8% drop is a total drop of only four students. We believe that going from 53 students in the 2017 academic year to 49 in the 2018 academic year is not as strong an indicator as the 8% might seem to show. Although we do hope to increase the number of students in the program, staying around 50 is healthy, indicating a reasonable cohort in each year. In addition, although we have seen an overall drop in the number of majors, we are regularly improving on the SSH of majors in program classes (#3). We have seen a 49% increase (from 139-207) from the 2016 to 2018 reporting years, and believe this is due to rather substantial efforts we have made to provide the full range of required courses at both campuses, including working with UHH to open HawCC-only seats in courses that we are unable to provide on our campus.

Our Efficiency health is “Cautionary.” Efficiency is rated on two indicators: Class Fill Rate and Students to BOR Faculty. The Class Fill Rate sub-indicator is unhealthy. Fill rate for our classes is 45.4%, a drop of 25% since the previous year (which was 60.8%). This is partially due to the fact that we have finally been able to offer physics for the Pāalamanui students. Up until this year we did not have the instructors nor facilities to offer physics on that campus and students were unable to graduate. Now that we are able to offer it, we have not yet built up a large demand for the class and many students have been unprepared with the pre-requisite courses. We believe that, like the increase in enrollment in biology as students become aware of the availability of the classes, we will see similar trends in physics and will start to see fewer under-enrolled sections in the future. We have 16 students per BOR faculty member, a number that puts us at “healthy” for that sub-indicator. Combined, the two sub-indicators create a cautionary status. The number of low-enrolled courses has increased by 43% (from 7 to 10) over the past three years. This is likely due to our efforts to provide a more complete ASNS course offering at the Pāalamanui campus. As students become aware of the course offerings, we expect to reduce the number of low-enrolled sections, since more students will be planning on taking the courses there rather than transferring before completion of the degree.

Our Effectiveness indicator continues to be “Cautionary.” In the 2018 academic year, we had 62% persistence from fall to spring semester, considerably below the 75% required for a healthy rating. Over the past three years, our fall-spring persistence has never been above 65%. One reason for the low persistence is that we do not yet have the facilities to teach all of the required courses at our Hilo campus. Of the nine students who transferred to a UH 4-year campus, only 22% of them transferred with a degree. Eighty percent of our transferring students are doing so before obtaining a degree which is most likely due to the difficulty in obtaining a degree entirely on our campuses. As the program is able to add facilities, we expect to see this indicator improve. We have doubled the number of program graduates since 2016 and have increased the number of transfers to a UH 4-year institution by 29%. Again, most of our transfers (78%) are transferring without an AS in Natural Science which is due to the fact that we are unable to offer the full range of courses required for the major. However, new agreements with UHH that allow ASNS students to take UHH courses before transferring, seem to be improving the ability of our students to finish their Associate’s degree before transferring: in 2017, 100% of our transferring students did so without a HawCC degree; in 2018 less than 80% of the transferring ASNS students did so. We hope to see these pre-degree transfers reduced as the program grows to better meet student needs.

3. Program Student Learning Outcomes

- **List of the Program Learning Outcomes (PLOs)**

1. Analyze data effectively using current technology
2. Communicate scientific ideas and principles clearly and effectively
3. Analyze and apply fundamental mathematical, physical, and chemical concepts and techniques to scientific issues
4. Apply fundamental concepts and techniques in their chosen concentration

- **Program Learning Outcomes assessed in AY18-19**

NSCI PLOs 2, 3 & 4 were assessed in Fall 2018 and no NSCI PLOs were assessed in Spring 2019.

- **Assessment Results and Changes that have been made as a result of the assessments.**

PLO assessment results can be seen below:

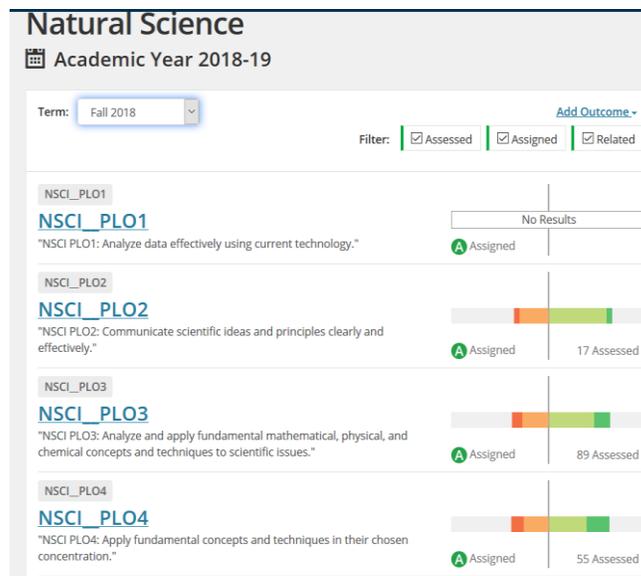


Image of PLO Assessment from Campus Labs for NSCI

The results of PLO2 come exclusively from CLO2 of two sections of BIOL 171L. The chosen measure was stringent, and only 65% of students met the expected outcome (we expected to see 70% meet). At the time of this assessment, there were also no English prerequisites for this course, which may have also contributed to low achievement rate for PLO2, which was assessed by using lab reports as artifacts. English prerequisites were

added for Fall 2019, and while lessons have been learned in assessment, faculty have also adopted AVID techniques and are incorporating those into the lab curriculum.

PLO3 was assessed via the CLO attainment of four course sections, two each in BIOL 171 (CLO1 and CLO2) and 171L (CLO1 and CLO2). For BIOL 171, 62% of the students met CLO1 and CLO2. This was below the expected rate of success, and it was determined that the low score was mainly due to attainment of proficiency in specific topics that are more conceptual and harder to visualize. For BIOL 171L, 65% of students met CLO1 and 65% met CLO2. This was also below the expected success rate. As discussed in the previous paragraph, English prerequisites were added to ensure that students have the necessary basic communication skills, and to reach students in the “below” metric categories, faculties plan to scaffold more preparatory activities leading up to the final lab report.

PLO4 was assessed through CLO3, 4, 5 and 6 of two sections of BIOL 171. Seventy-nine percent of students met or exceeded CLO3, 58% met CLO4, and 42% met CLO 5. During the assessment process, it became obvious that CLO6 was inappropriate for this course, and it is being removed from the CLO through the curricular process. The two more abstract topics covered in CLO4 and CLO5 were more difficult for students to grasp than CLO3, which is based on general knowledge, and the attainment rates reflect this. In order to improve student attainment of these CLO, the faculty will be incorporating instructional changes such as using AVID techniques in the classroom.

4. Action Plan

Include how the actions within the plan support the college's mission. In addition to the overall action plan for the program, include specific action plans for any Perkins Core Indicator for which the program did not meet the performance level.

ASNS is not analyzed for Perkins indicators, and they will not be discussed here.

The Natural Science program will continue to discuss and advocate for the laboratory spaces and funding from the Administration. PHYS 151/L, 152/L, 170/L and 171/L are required for our majors but cannot be offered through Hawai'i CC until lab space is created on both campuses. At present we are using temporary lab space that can hold up to 7 students on the Pālanui campus and have no lab space available on the Manono campus and are unable to offer physics labs there. Additionally, we are limited in the number of labs we can offer by the lack of a prep space for any of our science courses. This means that all preparation for upcoming labs is done in the space in which the labs are held, precluding efficient use of the laboratory spaces.

Additionally, to match the AS-NSCI program that is offered at other campuses, we hope to add BIOL 275, Cell and Molecular Biology lecture, as well as BIOL 275L, Cell and Molecular Laboratory, to our course offerings in Fall 2020. Both courses have passed the College's Curriculum Review Committee, and an OER textbook is in development for the laboratory. The laboratory can be taught in existing science labs, but it will require purchasing additional laboratory equipment for both campuses the first time it is taught and additional laboratory supplies will be needed each semester.

Science and Math courses also currently share and have only one video conferencing classroom available on the Manono campus. Having additional classrooms will allow us to more effectively combine teaching resources across the two campuses and support the growth of the program.

In order to increase student retention in the program, we will advocate for funding to hire science tutors and peer mentors on both campuses. Although we have access to online tutoring services, many students prefer meeting with a tutor face-to-face to discuss difficult-to-comprehend scientific subjects, and our ability to have stable tutoring services in science is critical to supporting student success in this program.

We will continue to provide support for professional development of our faculty. We believe that all faculty should have access to both subject-specific and pedagogical support. This support will include encouragement to attend local and national conferences and workshops to keep current in scientific developments in their field as well as novel teaching techniques that will help them to bring this knowledge to their classroom. In addition, we will work with the Administration to provide office space, furniture and equipment (e.g., phones) for all faculty.

We will encourage students to participate in internship and research opportunities and will be supportive of faculty who can offer such opportunities to our students.

We will work on developing alternatives for expensive textbooks and lab manuals. This will include exploration of Open Educational Resources (OER), low-cost alternatives, and materials written in-house.

The Hawaii Community College Mission is:

“To promote lifelong learning, Hawai'i Community College will emphasize the knowledge and experience necessary for Kauhale members to pursue academic achievement and workforce readiness. Aligned with the mission of the UH

Community Colleges, we are committed to serving all segments of our Hawai'i Island community.”

Through taking laboratory courses, through supporting the professional development of our faculty, and through encouraging students to bring their learning outside the classroom, we will be supporting this mission. Through supporting the physical needs of faculty (such as providing office space), we will increase the productivity of faculty and increase their ability to nurture students. Reducing the cost of college attendance will help to support our students financially. Students will have the opportunity to use current technology, write lab reports on their experiences, analyze data and apply concepts and techniques in physics. They will be exposed to current science through well-versed faculty and current teaching strategies in the classroom. They will encounter novel experiences in science through faculty and/or community engagement. This will help students to develop the knowledge and curiosity needed to support their goals of lifelong learning and will allow them to gain the specific knowledge needed in their science program, leading to academic achievement and workforce readiness.

5. Resource Implications

(physical, human, financial)

The program requires funding and space for the Manono and Pāalamanui laboratories, prep spaces, and vidcon classrooms as well as faculty offices and will require financial support for faculty and students for professional development and for resources and equipment needed to help support students and to pay student tutors.

Renovation of the STEM center will provide space for faculty offices and re-development of existing spaces can make laboratory and prep spaces available. For the development of lower-cost course materials (textbooks and manuals), reassigned time for faculty actively writing curriculum should be provided. Additionally, we request that faculty be provided funding to attend a minimum of one professional development opportunity per year, preferably one that is teaching-focused and/or contributes to knowledge in their field.