

DEGREE PROGRAM REVIEW

Associate in Science in Natural Science (ASNS) Fall 2012

Program Mission Statement

The mission of the Associate in Science in Natural Science (ASNS) degree is to provide a comprehensive academic background for students planning to transfer to a baccalaureate degree program in Science, Mathematics, Engineering, and Technology (STEM) subject areas.

I. Quantitative Indicators: N/A

II. Outcome and Goal Achievement

A. Program Learning Outcomes:

- Upon successful completion of the ASNS Degree Program, students will be able to
 1. explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions;
 2. explain scientific knowledge and understanding to different audiences for a range of purposes; and
 3. apply scientific knowledge, skills, and understandings to problems and issues in daily life.
- Program map: Refer to Appendix #1.
- Assessment plan: Refer to Appendix #2.

B. Analysis of Student Outcome and Goal Achievement

- PLO assessed:
 1. *Upon successful completion of the AS-NS Degree Program students will be able to explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions.*
- Method used to analyze outcome: Faculty Report on Evidence of ASNS Degree Program Learning Outcome Achievement. Refer to Appendix #3 for the assessment tool form. Evidence of student learning to support the PLO was collected from Chemistry 161, 161L, and 162L, which are the gatekeeper courses for all the concentrations in this degree. By the time students are enrolled in

College Chemistry their mathematics skills are better than the average UHMC student and the concepts that are introduced are logical and have many applications. Summaries of the assessments are included in Appendices #4.1, 4.2, and 4.3.

- Criteria for success: Number of students transferring to STEM baccalaureate degrees at other colleges
- Findings: According to the *Rubric for Evaluating Program Outcome and Goal Achievement*, the ASNS degree program ranked
 - Acceptable in
 - PLOs - Faculty expectation of their graduates
 - Assessment methods - How faculty will collect evidence to determine how well students meet their expectations
 - Action plan – The changes made to address issues in the findings and the efficacy of the changes.
 - Exemplary in
 - Criteria for success - The level of performance that meets program standards
 - Findings – The degree to which students met the program standard
- Findings: According to the *UH Maui College Degree Program Assessment Rubric, Essential Elements*, the ASNS degree program ranked
 - Awareness in
 - Engaged Community
 - Developing in
 - Environment for Achievement: Retention, Persistence, and Graduation Rates
 - Outcome and Goal Achievement
 - Budgetary Consideration and Impact
 - Proficient in
 - Recognize and Support Best Practices
 - Planning and Policy Considerations

C. Action Plan

- Changes to improve student learning
 - As noted in the assessment, the instructor has instituted complete laboratory reports this semester in CHEM 161L.
 - The instructor holds regular study and review sessions for students who need additional help.
 - The instructor offers extra credit for reports on scientific articles that illustrate applications and relate directly to the topics begin covered in class.
- How assessment supports current program goals

- Three of the ASNS gatekeeper courses (Chemistry 161, 161L, and 162L) indicate that instruction clearly supports the program goals
- Program strengths and weaknesses
 - The ASNS degree has just recently been instituted
 - 13 students are currently enrolled, refer to Appendix #5
 - Counselors are directing STEM students to this degree
 - At least one student will be graduating with this degree in Spring 2013
 - Engineering Technology faculty are discussing developing an ASNS Pre-Engineering Concentration

III. Engaged Community

- Evidence of community engagement is indicated by
 1. an increasing interest in and enrollment in the ASNS program as students become more aware of a) the opportunities in STEM careers and b) the advantages of a degree that focuses on pre-requisites for baccalaureate degrees;
 2. the recent Department of Labor grant award focuses on training for sustainable energy and GPS/GIS technology careers where there are emerging opportunities;
 3. institution of the popular Summer Bridge programs for Native Hawaiian high-school students in Computer Technology, Engineering, Sustainable Technologies, and Marine Science;
 4. an increase in grant request-for-proposals (RFPs) addressing needs in STEM areas (UHMC submitted a B-WET proposal for a teacher training workshop in earth and ocean sciences);
 5. Chancellor Sakamoto and Ann Coopersmith serving as Principle Investigator and Senior Personnel respectively on an NSF grant for the Center for Ocean Sciences Education Excellence – Island Earth (COSEE-IE); and
 6. an increase in a) internships at the Hawaiian Islands Humpback National Marine Sanctuary and the Maui Ocean Center and b) service-learning projects with Whale Trust, Hawai'i Wildlife Fund, Maui Nui Botanical Garden, UHMC Community Garden, and Digital Bus.

IV. Recognize and Support Best Practices

- Use of innovative teaching techniques and technology

The development of various technological tools in the sciences is expanding just as rapidly as the use of computers and the Internet in teaching and, in many cases, using the computer as an interface for data collection and analysis. Some examples from the science laboratory classes are included below.

 1. Recently we have been using GPS and GIS technologies in field classes. The new DOL grant is focusing on these skills for viable career options.

2. Reasonably priced chemical kits and probes (such as those from Vernier) allow students to quickly determine a great variety of water, soil, air, and physiological parameters without complicated and time-consuming analytical lab procedures. These lab tools also allows data to be recorded over time in a continuous experiment.
3. Contamination of sea water with mammalian bacteria can be determined easily by anyone using the IDEXX method to detect levels of *Enterococcus* bacteria in ocean waters. Any data that indicates levels above those considered safe is immediately reported to Department of Health, Clean Water Branch for follow-up on exact measures and remediation.
4. Many reasonably priced kits are available for experiments and demonstrations of a wide variety of biotechnical and sustainable science topics.

V. Planning and Policy Considerations

- Curriculum changes:
 1. Yearly updates are made to the program to include newly developed or additional appropriate courses and to delete courses that have been dropped from the catalog. Refer to Appendix #6.
 2. In Fall 2012, a CAR for a Marine Science Concentration was proposed to prepare UHMC students to enroll in the UH-Hilo Bachelor in Arts in Marine Science (BAMS) degree that will be offered by distance learning. Refer to Appendix #7.

VI. Budgetary Considerations and Impact

- Capital, operational, and supply budget based on evidence of assessment:
 1. This program is most fortunate to have access to a new science building beginning in the fall of 2013. Included in that project is state-of-the-art course delivery equipment and there will be ample laboratory space to allow for additional sections in most of the sciences. This may necessitate hiring more instructors to teach an increased number of laboratory sections. For many years, there has been a clear stated need for both full-time Chemistry and Oceanography instructors and another Physics instructor will need to be hired to replace the one who recently moved back to Oahu.
 2. There is money in the RDP grant for Ocean Studies that will allow the college to acquire approximately \$80,000 in equipment and supplies in to support the marine sciences programs.
 3. There is additional money in the RDP grant for Ocean Studies to hire an additional counselor for the Marine Sciences BA and BAS degrees, which will relieve the counseling load for STEM students.