

Instructional Comprehensive Program Review: Natural Sciences 2013-16

College Mission Statement

Kapi'olani Community College:

- is a gathering place where Hawai'i's cultural diversity is celebrated, championed and reflected in the curriculum, pedagogy, support services and activities, students, faculty, staff, and administration.
- is a nurturing workplace of choice for strong and caring faculty, staff, and administrators committed to effective communication and shared vision, values, mission, and responsibilities.
- strives to provide the highest quality education and training for Hawai'i's people.
- provides open access, and promotes students' progress, learning and success with low tuition and high quality instructional programs, student development and support services, and selective areas of excellence and emphasis.
- prepares students to meet rigorous associate and baccalaureate requirements and personal enrichment goals by offering high quality liberal arts and other articulated transfer programs.
- delivers high quality 21st century career programs that prepare students for rigorous employment standards and to meet critical workforce immediate and long-term needs and contribute to a diversifying state economy.
- prepares students for lives of ethical and social responsibility by offering opportunities for increased service-learning and community engagement.
- leads locally, regionally, nationally and internationally in the development of integrated international education, enriched through global collaborations.
- uses human, physical, technological and financial resources effectively and efficiently to achieve ambitious educational goals and generate a solid return on the public's investment for a sustainable future.
- builds partnerships within the University and with other educational, governmental, business, and non-profit organizations to support improved lifelong learning.
- uses ongoing cycles of planning, best practice research, budgeting, implementation, assessment, and evaluation to drive continuous program and institutional improvement.

Program Mission Statement

The Arts & Sciences academic cluster provides high-quality and innovative programs that prepare students to meet rigorous baccalaureate requirements and personal enrichment goals, pursue lifelong learning, and lead lives of ethical, responsible community involvement. Four programs of study are offered: Biotechnician, Liberal Arts, New Media Arts, and Natural Sciences.

Part I: Executive Summary of CPR and Response to previous program review recommendations

Previous ARPDs have revealed that enrollment in ASNS degree has increased. However, the number of faculty teaching major courses has decreased due to retirements and resignations. The lecture and laboratory courses being offered every semester have increased; however, spaces available for classes and undergraduate research have not increased. The growth in the enrollment cannot be sustained if these challenges are not addressed.

In 2011, the Program Student Learning Outcomes were assessed and were aligned with the AA in Liberal Arts program SLOs. As a result of this process, the faculty concluded that the existing PSLOs must be re-aligned with the goals of the STEM Initiative and the ASNS degree. A committee was formed and the new PSLOs for the ASNS degree are currently being discussed, before submission to the Curriculum Committee.

Part II: Program Description & History

The Arts & Sciences program was established in 1965 when Kapi'olani Technical School was converted into Kapi'olani Community College.

The Arts & Sciences (A&S) academic cluster is composed of four units: Arts & Humanities; Languages, Linguistics and Literature (originally referred to as "Language Arts"); Math and Sciences; and Social Sciences. With a staff and faculty numbering well over 200 and responsibility for over 70% of the College's overall SSH enrollment, the A&S cluster is the single largest organizational unit at Kapi'olani Community College. A&S offers courses in support of General Education, transfer to a four-year university, as well as select career programs intended to lead to immediate employment ("A/S Tactical Plan Background").

At Kapi'olani Community College, Natural Sciences students can graduate with the AS Natural Sciences degree, an Associate in Arts (AA) degree, complete subject certificates, transfer into a college or university, and continue as lifelong learners. The Ka'ie'ie dual enrollment program provides a new pathway to a four-year degree by providing pre-admission to a select group of Kapi'olani CC students.

Efforts to clarify student pathways led to the introduction of the AS Natural Sciences degree.

The Associate in Science in Natural Science degree (ASNS) was proposed in 2007 and was established in 2011. The primary objective of the ASNS degree is to 1) transfer students into baccalaureate degrees in Science, Technology, Engineering, and Mathematics (STEM) at the University of Hawai'i at Manoa (UHM), the University of Hawai'i at Hilo (UHH) and other universities in Hawai'i and on the US mainland and 2) prepare KapCC STEM students or a career in a STEM field. The entire ASNS curriculum consists of courses articulated across the University of Hawai'i system that meet requirements or serve as electives for STEM majors at UHM and UHH. This program is also well suited for nontraditional students who need to attain proficiency in fundamental math and science courses in order to retrain for a STEM career. Much of the core ASNS curriculum is offered online to allow access for working professionals and others whose commitments may make it difficult to attend on-campus classes. The degrees provides potential STEM employers with assurance that ASNS graduates have successfully completed courses in calculus mathematics, computer science, and fundamental sciences, and have a firm grasp of the scientific method, how to make presentations, how to write scientific reports and how to work as a team member.

Program Goals (A & S Tactical Plan, Strategic Outcomes)

1. Become the leading indigenous-serving higher education institution & support the access & success of Native Hawaiian students;
2. Increase the educational capital of the state by increasing the participation and degree completion of students;
3. Address critical workforce shortages and prepare students for effective engagement and leadership;
4. Recognize and invest in faculty and staff and develop innovative learning environments in which to work.

Program Student Learning Outcomes (SLO)

The Associate of Science in Natural Science Program Student Learning Outcomes are:

- Explain the natural and technological world using reflection and quantitative analysis to prepare a plan, to collect, process, and interpret data; to communicate conclusions; and to evaluate the plan, procedures and findings
- Express scientific knowledge and understanding to different audiences for a range of purposes
- Apply scientific knowledge, skills, and understandings to issues in daily life
- Articulate the ethical issues of the impact on people and on the local and global environment of the processes and likely products of science
- Relate how the physical environment of Earth and its position in the universe impacts the way we live
- Relate the scientific concepts of energy to our existence and quality of life
- Explain the interdependence of their our biology and that of other living things

Credentials and Licensures offered:

N/A

Faculty and Staff (overlap with Liberal Arts as reported in ARPD, 2011-12)

Annual FTE Faculty:	95.2 (count)
	138.3 (analytic)
Annual FTE Staff:	12 (STEM & Civil Service)
Lecturers/Adjunct Faculty	140 (approximate)
Majors (from ARPD 2011-12)	3873

Resources

The bulk of the funds allocated to ASNS are from the general (state) funds as awarded by the Hawai'i State Legislature. There is also significant budgetary and in-kind support from non-resident (ESOL program) tuition revenue, U.S. Department of Education, Title III, National Science Foundation, National Endowment for the Humanities, ARRA/Achieving the Dream and various other external sources. Some funding is allocated to the four departments which contribute to the ASNS program and other funds are awarded specifically to ASNS.

Several prestigious National Science Foundations (NSF) grants have also been awarded to the College to support the STEM Initiative. Two grants (PEEC and TCUP II) support Native Hawaiian students in ASNS. The S-STEM Grant provides ASNS scholarships based on academic success and financial needs. The I3 Grant provides funding for faculty development to improve student success, retention and graduation.

Articulation Agreements

Recognizing the primacy of in-system transfer, Kapi’olani has signed articulation agreements with three University of Hawai’i campuses: UH Mānoa, UH Hilo, and UH West O’ahu. The college has also secured articulation agreements with Chaminade University of Honolulu, Pacific University, Oregon State University, and Lamar University.

Articulation and transfer agreement has also been secured with the College of Engineering at UHM for the ASNS Engineering pathway.

Advisory and Community Connections (from A&S Tactical Plan)

Hawai’i Department of Education, National Science Foundation, U.S. Department of Education, State of Hawai’i, State of Hawai’i DBEDT, PCATT, ARRA/Achieving the Dream

Part III: Quantitative Indicators for Program Review (ARPD for 2009-10, 2010-11 & 2011-12)

	Demand	Efficiency	Effectiveness	Overall
2009 -2010	Healthy	Cautionary	Cautionary	Cautionary
2010 - 2011	Healthy	Cautionary	Cautionary	Cautionary
2011 - 2012	Cautionary	Cautionary	Healthy	Cautionary

The following is an analysis of quantitative trends identified over the past three years of ARPD data:

Demand Indicators:

The ASNS degree has been the fastest growing program. ARPD indicated that the number of majors grew from 113 majors in 2009-10 to 219 majors in 2010-11. However, in 2011 – 2012, data provided by the system office seems highly improbable. It indicates that the ASNS program grew by just one student. Program data show a total of 330 unduplicated majors for 2011-12.

Efficiency Indicators:

There are no FTE BOR appointed faculty in the program. The faculty teaching the majors courses are FTE BOR appointed faculty in the AA program and lecturers. Thus the student faculty ratio will remain unhealthy.

In 2011 – 2012, there were 8.0 analytic FTE faculty teaching majors’ courses in the ASNS degree. With 220 majors, the majors to analytic FTE faculty ratio is 27.6. Lecturers taught seventy-four majors credits.

Effectiveness Indicators:

The effectiveness indicators point to an increase on every element within the category. Direct and intentional student interventions have increased the Associate Degrees awarded well beyond the set goal. The transfer rate to the University of Hawai’i 4-year campuses increased by 73%.

Distance Education: Completely Online Courses

The number of ASNS major courses that are offered completely online have decreased. However, the number of hybrid classes offered has increased. Persistence rate for 2011-12 have increased by 21 %.

Part IV: Curriculum Revision and Review

In July 2011, the ASNS program was taken to the BOR and was approved as an “established” program, Other UHCC’s have submitted proposals for a ASNS degree using KapCC as a model. In 2011 – 2012, ASNS added a third concentration in pre-engineering. In 2011 – 2012, two new courses were offered. These were ME 213 and EE 296. Both courses are project based courses that are requirements of the baccalaureate degrees in Mechanical and Electrical Engineering.

Studies show that undergraduate research is one of the best practices in education for student success, retention, persistence and graduation. In 2012, a new course SCI 295 (alpha) was proposed and approved. This course is an undergraduate research course with the “alpha” indicating the discipline on which research was conducted. Undergraduate research will also be embedded in existing courses. All of these courses that focus on undergraduate research will have a “RI” (research intensive) designation in Banner.

All of the majors courses in the ASNS degree have been revised and updated and are therefore in compliance with the 5-year review.

Part V. Survey Results

The Pacific Research and Evaluation – Portland (PRE-P) team was chosen as the NSF Grants External Evaluators. The team came for a site visit in July 2012. Focused groups were conducted with ASNS students focused on how the activities of the NSF grants have impacted their decision to pursue a degree in STEM. The first report is scheduled for July 2013. Recommendations will be incorporated in the upcoming CPRs.

Part VI. Analysis of the Program

Alignment with mission

The AS in Natural Science program is principally a degree structured to facilitate transfer to a four-year university. Consistent efforts to more carefully align the ASNS program with university transfer have been made in messaging, publications, program design, and articulation.

Current Situation: Internal

After reviewing the 2008-2015 Strategic Plan, the 2011 Annual Report of Instructional Program Data (ARPD), and the Arts & Sciences Tactical Plan Update, the following were identified as the most significant internal factors influencing ASNS program planning:

- WASC ACCJC mandates for outcomes assessment and strategic planning/resource allocation
- UH System goals for community college to university transfer
- UH System goals for degree completion
- An overall decrease in enrollment at KCC
- Efforts to clarify student pathways have led to the introduction of the AS Natural Sciences degree and the addition of the Engineering Track.

The cumulative number of ASNS students since 2007 (inception of the ASNS degree) excluding the number of graduates is around 700 and 184 of these are Native Hawaiians. There are three degree pathways: Biological Sciences, Physical Sciences, and Engineering. The NSF Grants awarded to the College has helped with the strategies and activities to achieve participation and success (Degree Completion) by Native Hawaiian students. Strategies and activities to achieve this were: scholarships, peer mentoring, Peer Led Unit Study (PLUS), undergraduate research experience (URE), internships and advising. However, faculty needs to be compensated for mentoring undergraduate research experience. In addition, access to scientific journals is also critical to the success of URE.

The most significant internal threat is the ongoing lack of space which may be dedicated to Natural Sciences use. Appropriate laboratory spaces which allow adequate water flow, drainage, ventilation, bench space, preparation space, and storage are not available. This CPR has identified this lack of dedicated space as a factor which will continue to limit the potential expansion of this program of study.

Faculty positions left vacant due to resignation or retirement should be considered for recruitment. Some disciplinary areas have been identified for growth and development. The number of courses offered, that satisfy the Diversification and Foundational requirements has increased. The number of MATH FTEs has decreased to a number that is unhealthy for the program and needs attention. Competition for Lecturers at other UHCCs and UH Mānoa has made it difficult to sustain the level of excellence for which Kapi'olani's Natural Sciences program is known. The lack of consistent staffing is a significant weakness that was identified by this CPR.

Another laboratory technician has been hired by the College in response to the increase in the number of laboratory classes that are offered. However, if undergraduate research experience will be institutionalized, another laboratory technician will be needed.

Classes where research will be imbedded (RI classes) will be offered in Fall 2013. In addition SCI 295 will be offered after assessment of these initial RI courses has been conducted. Offering the SCI 295 courses will be a challenge as there are no spaces allocated to do undergraduate research. The College must be committed to this initiative in order for this best practice to be implemented successfully.

Current Situation: External

Following a review of "Planning Shaped By External Context," found on pages 10-13 of the Strategic Plan, 2008-2015, the following were identified as the most significant external factors influencing ASNS program planning:

- WASC ACCJC mandates for outcomes assessment and strategic planning/resource allocation
- UH System goals for community college to university transfer
- UH System goals for degree completion
- President Obama's national agenda to enhance degree attainment at all levels of higher education
- Competition for enrollment from other Oahu-based community colleges in higher growth regions

Assessment Results for Program SLO's

In 2011 – 2012, some or all of the ASNS Program Student Learning Outcomes (PLOS) were assessed. This process led to the conclusion that the ASNS PLSO as written, were aligned with the Liberal Arts PSLOs, and but not specifically focused on the goals of the ASNS degree which made the goals difficult to assess. With the need to update the PSLOs, a committee was formed to work on this project. The

following PLOS, which focuses on goals to prepare and transfer students in a baccalaureate degree in the Science, Technology, Engineering and Math (STEM) fields, are currently being discussed:

- Apply scientific knowledge, skills, and methods to problem solving in Hawai'i and elsewhere.
- Utilize analytical reasoning or mathematical techniques to describe physical and biological phenomena.
- Design and conduct scientific or mathematically based investigations and effectively communicate the findings.

Next Steps in Assessment and Improvement Strategies

Plans on how to assess the new PSLOs are currently being discussed. The committee members are working on the rubric for assessment. The new PLSOs will be submitted for Program Revision to the Curriculum Committee in Fall 2013.

Part VII: Tactical Action Plan, 2013-16

The Arts & Sciences unit is backwards from the rest of KCC in that four departments primarily contribute to a one very large academic program as well as several smaller programs including Natural Sciences. Faculty are shared by multiple programs across departmental lines. Consequently, as a result of extensive dialogue by the Deans Advisory Council on the CPR, a decision was made that the Tactical Action Plan for Natural Sciences and other programs housed in Arts & Sciences should mirror that of the overall Arts & Sciences academic cluster.

STRATEGIC OUTCOMES (KCC Strategic Plan)	<ul style="list-style-type: none"> A. Become the leading indigenous-serving higher education institution & support the access & success of Native Hawaiian students B. Increase the educational capital of the state by increasing the participation and degree completion of students D. Address critical workforce shortages and prepare students for effective engagement and leadership E. Recognize and invest in faculty and staff and develop innovative learning environments in which to work
PERFORMANCE MEASURES	<ul style="list-style-type: none"> 1) Support employee recruitment, training, and retention to increase student success in transfer-level courses (B3) 2) Implement a process for the regular review of courses and programs (D10) 3) Increase student “success” as defined by persistence, graduation, and transfer rates for Native Hawaiian and non-Hawaiian students (D4) 4) Gather useful data to inform decision-making 5) Recruit, renew, and retain a qualified, effective, and diverse faculty, staff, and leadership team committed to strategic outcomes and student-centered performance measures (E1)

<p style="text-align: center;">STRATEGIES</p>	<ol style="list-style-type: none"> 1) Re/design and create courses which include innovative pedagogy, updated content, and alternative delivery methods (B3) 2) Support programs and faculty initiatives that promote student engagement, learning, and achievement 3) Complete a cycle of learning outcomes assessment in general education diversification areas and all programs of study and use program assessment results to implement improvements (D10) 4) Align course and program outcomes 5) Continue the five-year curriculum review process (D10) 6) Provide orientation, training, and support to new faculty and professional development for continuing faculty (E1) 7) Provide appropriate staffing, workspaces, and/or resources as needed to support student engagement, learning, and achievement
<p style="text-align: center;">MEANS OF ASSESSMENT</p>	<ol style="list-style-type: none"> 1) Number of courses redesigned and programs reviewed 2) Number of declared majors 3) Number of degrees awarded 4) UHM transfer rate
<p style="text-align: center;">INDIVIDUALS RESPONSIBLE</p>	<p>Faculty Department Chairs APT Staff STEM Center staff Assessment Coordinator(s) Secretaries Dean</p>
<p style="text-align: center;">SYNERGIES WITH OTHER PROGRAMS, UNITS, EMPHASES, and INITIATIVES</p>	<p>Maida Kamber Center CELTT, Library, & Testing Achieving the Dream initiative & Title III Student Services Kahikoluamea CTE and Health Academic Clusters Ka'ie'ie and other university pathways OFIE and Service Learning Business Office Human Resources Office</p>

Part VIII. Resource and Budget Implications

To align with the current budget allocation process, resource requests will continue to be made from the Arts & Sciences unit as a whole. Resource requests will be considered by the Department Chairs and Dean and prioritized on behalf of the Arts & Sciences unit. Such requests will be taken forward to the senior administration as prioritized requests.

Faculty positions left vacant due to resignation or retirement should be considered for recruitment. In some Arts & Sciences disciplines, particularly those which have been disproportionately impacted by retirements and resignations, faculty leadership will help to better position the college for continued growth. Other resources to support program goals around transfer, persistence, and graduation will be needed.