

Instructional Comprehensive Program Review: Natural Sciences 2016-2019

College Mission Statement:

Kapi'olani Community College provides students from Hawai'i's diverse communities open access to higher education opportunities in pursuit of academic, career, and lifelong learning goals. The College, guided by shared vision and values, and commitment to engagement, learning, and achievement, offers high quality certificate, associate degree, and transfer programs that prepare students for productive futures.

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.

Program Goals

The goal of the Kapi'olani Community College STEM Program is to improve the overall quality of education in the fields of science, technology, engineering and mathematics (STEM). This is accomplished through outreach programs, initiatives to promote student success, and undergraduate research projects as well as through traditional instructional classes here at the college. These efforts are designed to:

- Increase the number of students enrolled in the ASNS program
- increase the number of STEM students transferring into 4-year degree programs, and
- Increase the number of ASNS student graduates.

Part I: Executive Summary of CPR and Response to Previous Program Review Recommendations

The KCC ASNS degree program is at a critical juncture. It has enjoyed growth and success due to initiatives supported by several federal and local grants. Some the major grant funding is coming to an end and the continued growth and success of the ASNS degree will depend on the degree to which some of these successful initiatives are institutionalized.

Undergraduate research experience (URE) is a hallmark for the ASNS degree program, with the ASNS students winning awards at national competitions and conferences. It has been a source of pride for the students, the ASNS degree program, and the college. In order for URE to continue at the high level at which it is currently operating, the students need mentorship, support, space, and supplies. The mentorship has come through dedicated STEM faculty who work with the

students, and this has been supported through the creation of the SCI 295 undergraduate research courses and the "research intensive" (RI) course designation. However, support, supplies, and space are still needed.

- 1) Support: Institutionalization of an Undergraduate Research APT Position. There is growing momentum at the college for involving students in undergraduate research experiences. Coaching students through the URE process places a high demand on faculty mentors' time. A STEM URE support position is would provide much-needed logistic support and could also serve as a URE lab technician. As other disciplines expand their URE initiatives, this position would serve as a campus-wide resource and would benefit the entire campus.
- 2) Space for URE. Students need space to conduct inquiry-based undergraduate research. Currently, URE students are conducting research in various scattered locations on campus and off, many of which are temporary solutions. We will continue to request space over the long term. In addition, we will involve STEM faculty in discussions about the long range development plan of the college.
- 3) Supplies for ASNS courses. We will request that the Math and Sciences budget be restored so that the ASNS courses can have the supplies needed to provide rigorous science and engineering instruction with engaging course activities.
- 4) Lab Staff. The APT laboratory technician staffing for all the laboratories offered in the Math and Sciences department is very limited. In a typical semester the department offers 80-100 laboratory sections serving 1600 – 2000 students. All of the preparations for these lab sections are handled by only two APTs. This is unsustainable and has significant safety and compliance implications.
- 5) Support for Mentoring. The loss of NSF grant funds will completely terminate all student mentoring for ASNS courses (peer mentoring and PLUS mentoring). Unless the College can find a way to institutionalize the mentoring programs, an increase in attrition rates may follow. This is likely to affect the effectiveness of the ASNS degree program in the future.

Response to Previous Program Review Recommendations

Issue	Recommendation	Results
Faculty workload issue for URE mentors	Courses with RI designation and SCI 295 courses proposed.	RI designation –implemented in 2013 SCI 295 courses first offered in Spring 2014
SLOs did not reflect program goals (P-SLO analysis)	Change program SLOs	Revised SLOs effective Fall 2014; ASNS major courses aligned their course competencies to the new program outcomes.
Need a clear and focused pathway for students intending to pursue ICS baccalaureate degree.	Create a new ASNS concentration in ICS.	Pre-ICS concentration in the ASNS degree effective Fall 2014
Formalize and encourage undergraduate research experience for ASNS degree students.	Designate SCI 295 as an elective for the ASNS degree.	SCI 295 approved as an elective for the ASNS degree as of Fall 2014
Lack of success in Math courses, plus observation by some upper level ASNS Physics and Engineering course instructors that students’ math skills are lacking. (P-SLO analysis)	New Math faculty position requested.	Not approved. Lack of success in Math courses continues to hurt the ability for students to persist and complete their ASNS degree and/or transfer to the 4-year schools.
A disproportionate number of physics classes were taught by lecturers, and hiring a full time physics instructor would help increase the success rates for physical science and engineering concentrations of the ASNS degree. (P-SLO analysis)	New Physics faculty position requested.	Position approved and faculty member hired. This position was approved, and a full-time Physics faculty member was hired and started in Fall 2015.
Grant funding for STEM Undergraduate Research Coordinator ended.	Institutionalize the STEM Undergraduate Research APT Position	STEM Undergraduate Research APT position not funded. Alternately, a variety of STEM faculty and staff are working together to keep the URE initiatives going.
Seek grants that can cover initiatives to improve success in the MATH discipline and to continue the implementation of existing initiatives to improve student success and retention. (P-SLO analysis)	STEM faculty members applied for a Math grant.	Grant funding awarded to develop, implement, and assess the efficacy of a Math Emporium Immersion Model (MEIM) treatment that allows students to reach calculus level mathematics in one semester.

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.

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, which was proposed in 2007 and established in 2011. Since then, all other UHCCs have submitted proposals for an ASNS degree using KCC as a model and adopted the ASNS degree.

Program Goals

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 Mānoa (UHM), the University of Hawai‘i at Hilo (UHH) and other universities in Hawai‘i and on the US mainland and 2) prepare KCC STEM students or a career in a STEM field. To this day, four pathway concentrations have been created: Life Sciences, Physical Sciences, Pre-Engineering, and Information Computer Sciences. 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 Student Learning Outcomes (P-SLOs)

The Program Student Learning Outcomes were updated by Math and Sciences faculty members, in order to be aligned with the updates of many ASNS courses’ Student learning Outcomes and the overall program goals. The new outcomes became effective in Fall 2014.

Upon successful completion of the Associate in Science degree in Natural Science, the student should be able to:

- Apply scientific knowledge, skills, and methods to problem solving, with a special emphasis on Hawai'i, where appropriate.
- Utilize analytical reasoning or mathematical techniques to describe physical or biological phenomena.
- Conduct inquiry-based investigations using computer algorithms, engineering design reviews, and/or the scientific process.
- Critically review discipline-specific literature and effectively communicate unbiased research orally and in writing.

Credentials and Licensures Offered

N/A

Faculty and Staff

Overlap with Liberal Arts, as reported in 2015 Liberal Arts ARPD:

Annual FTE Faculty: 87.3 (count) 130.6 (analytic)

Annual FTE Staff: 10 (STEM & Civil Service)

Lecturers/Adjunct Faculty 127 - 135 (approximate)

Majors: 3,393

ASNS Degree Specific Faculty and Staff, as reported in 2015 ASNS ARPD:

FTE BOR Appointed Faculty: 2

Majors: 391

The fact that the ASNS degree program only has 2 BOR appointed faculty listed in the ARPD results in an “unhealthy” student to faculty ratio. Most courses in this degree program are taught by Liberal Arts faculty. In the future, having more ASNS dedicated faculty would greatly benefit the program.

Resources

The bulk of the funds allocated to the ASNS program are budget allocations from the general (state) funds as awarded by the Hawai'i State Legislature. There is also significant budgetary and in-kind support from the U.S. Department of Education, Title III, National Science Foundation, ARRA/Achieving the Dream, NASA and various other external sources.

Several prestigious National Science Foundation (NSF) grants have 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 provided ASNS scholarships based on academic success

and financial needs. The I3 Grant provided funding for faculty development to improve student success, retention and graduation. In addition, several grants have been obtained from NASA to support undergraduate research in space-related fields, and a grant from Kamehameha schools has also been awarded to support students' learning and projects in the biological sciences.

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.

In addition, an articulation and transfer agreement has been secured with the College of Engineering at UHM for the ASNS Engineering pathway. This agreement has been so successful for the ASNS Pre-Engineering students that it has been revised and extended in spring 2016 to all other community colleges offering an Engineering concentration for their ASNS degree.

Advisory and Community Connections

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: Curriculum Revision and Review

Studies show that undergraduate research experience (URE) is one of the best practices in education for student success, retention, persistence and graduation. Historically, URE was funded exclusively through grant funding, but the need for institutionalizing this important initiative became apparent. Two curricular changes addressed the institutionalization of URE. In 2013, 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 (example: SCI 295CH, STEM Research in Chemistry). SCI 295 was first offered in Spring 2014 with 5 options. In addition, undergraduate research is now also embedded in certain existing courses, which have an "RI" (research intensive) designation in Banner. These changes allow for student URE efforts to be formally recognized as part of their curriculum experience. In addition, SCI 295 was approved as an elective in the ASNS degree.

A second curricular change was the addition of a new ASNS concentration in Information and Computer Science. The Pre-Information and Computer Sciences concentration was approved in 2014. This program has fostered collaboration between the STEM and the ITS faculty and puts the "T" (technology) in the KCC STEM program.

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 IV: Survey Results

No surveys were administered during the three year period covered by this report.

Part V: Quantitative Indicators for Program Review (2013, 2014, 2015 ARPD)

	Demand	Efficiency	Effectiveness	Overall
2012 -2013	Healthy	Cautionary	Healthy	Healthy
2013 - 2014	Healthy	Cautionary	Healthy	Healthy
2014 - 2015	Healthy	Cautionary	Healthy	Healthy

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

Demand Indicators: The demand indicators remained "Healthy" due to a steady increase in the number of majors over the three year period, rising from 297 to 391. This is noteworthy since overall enrollment at the college was not increasing during this period. Another highlight of the demand indicators is the number of Native Hawaiian students, which rose from 63 to 77 over the three year period. The percentage of Native Hawaiian students remained approximately 20% of all ASNS majors, which is higher than the college-wide percentage of 17% Native Hawaiian students.

Efficiency Indicators: The efficiency health call remains in the "Cautionary" status due to the high ratio of students to BOR appointed faculty and a drop in the class fill rate. The student to faculty ratio is "unhealthy" due to the fact that there are only two FTE BOR appointed faculty members in the ASNS program. The faculty members teaching the bulk of the major courses are AA program FTE BOR appointed. As a result, the ratio of Majors to FTE BOR Appointed Faculty (195/1 in the 2015 ARPD) negatively impacts the health status of the program in this category, since a healthy ratio requires 15-35 students per faculty member.

In the final year of the three-year period, the class fill rate dropped by 5% to 72.1%, which just falls below the threshold (75%) to be considered "healthy." The lower fill rate may be related to two other statistics: the total number of classes taught has risen from 89 to 95 and the number of low enrolled classes (defined as 9 or fewer students) has increased substantially from 7 to 21. It is likely that these changes are partially due to the increase in the number of SCI 295 courses being offered each semester. SCI 295 courses are intensive undergraduate research experience (URE) courses whose enrollment is typically capped at 10 students. In Spring 2014, there were five SCI 295 courses offered, and by Fall 2014 the number of SCI 295 courses rose to seven each semester. Offering SCI 295 was part of the ASNS degree program's action plan to increase the undergraduate research experience (URE) opportunities for STEM students. This action was realized, and URE continues to be a hallmark of the ASNS degree program. The

institutionalization of URE via the SCI 295 courses is an asset to the program, even if it negatively affects the program's "fill rates."

Effectiveness Indicators: The "healthy" status was due to impressive increases in the number of graduates and transfers, both of which far exceeded the goal each year. Several interventions aimed at improving success in core STEM courses may be credited for the strong showing in this category, including incorporating undergraduate research into ASNS courses. Undergraduate research has been shown to correlate highly with ASNS degree completion and transfer. In addition, obtaining and filling a full-time Engineering position bolstered effectiveness, as there has been an increase in graduation and transfer of Pre-Engineering students.

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. While looking back on the prior three years, it is interesting to note how the program has been in alignment with both the previous and current Strategic Plan.

KCC Commitments – Outcome 1: Graduation

The ASNS Program is able to report a boost in student graduation in the last several years. The number of graduates has historically been low due to the fact that the majority of ASNS students transfer prior to completing the ASNS degree. However, last year, the ASNS program coordinators and counselors worked together to identify many students who transferred without graduating and reminded them to do so. This caused a significant increase in student graduates as demonstrated in Figure 1.

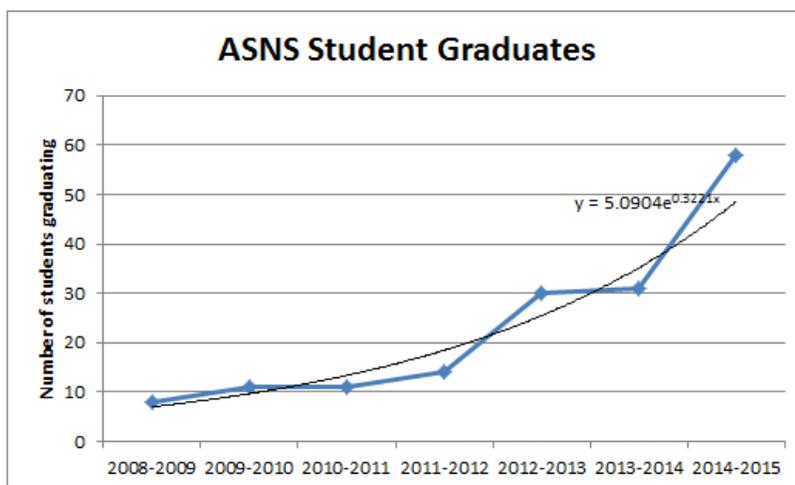


Figure 1: ASNS Student Graduates

The number of ASNS student graduates in 2015 (58) exceeded the projected measure of the College Strategic plan that set the goal of 33 students graduating with the ASNS degree by 2015 (outcome 2, J).

In addition, the ASNS program accomplished increases in transferring students to a four-year university in STEM. As seen in Figure 2, the number of ASNS student transfers has increased steadily since beginning of the implementation of the ASNS degree. In addition, it should be noted that many students who are also AA degrees also transfer to four-year universities in STEM and are not reflected in these data.

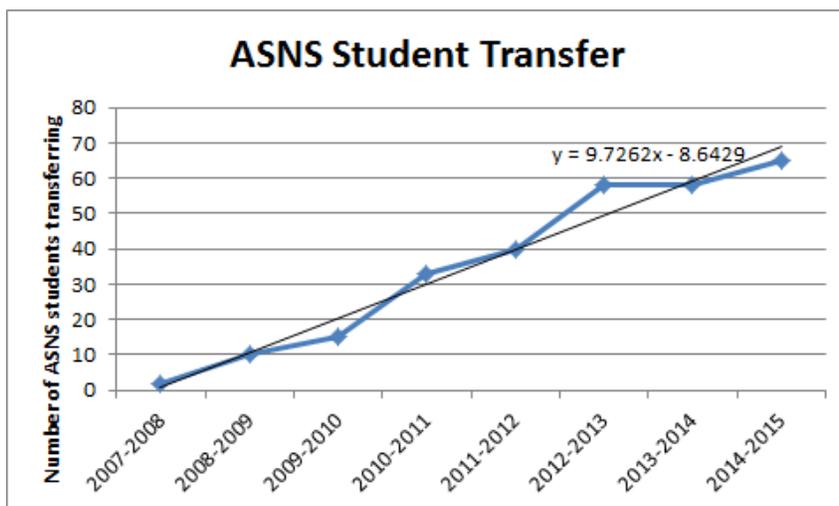


Figure 2: ASNS Student Transfer

It is important to note that the number of ASNS students transfer in 2015 (65) exceeds the projected measure of the College Strategic plan that set the goal of 45 ASNS students transferring to UH 4-year campuses by 2015 (outcome 2, H).

KCC Commitments – Outcome 3: Enrollment Growth

Since 2007, the number of ASNS students has increased significantly from 9 to 385. It has been the fastest growing major at KCC. Year-to-year numbers are shown in Figure 3.

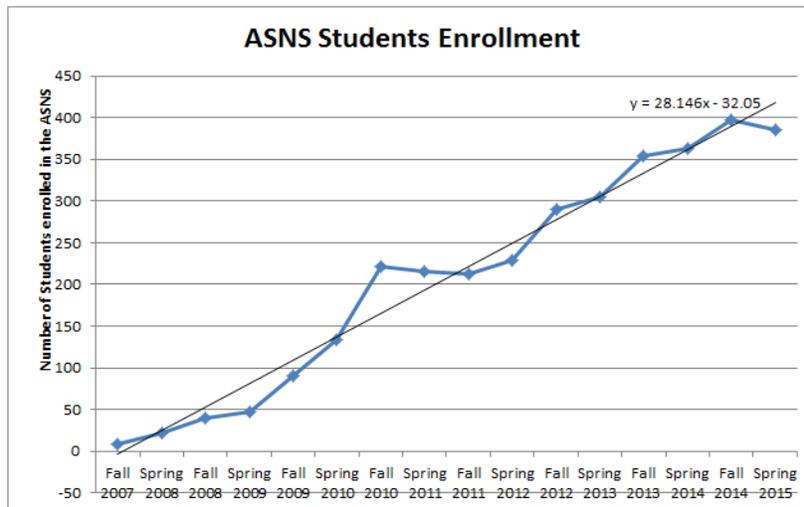


Figure 3: ASNS Student Enrollment

The positive slope value of the linear regression applied to the ASNS student enrollment data in confirms the steady and increasing amount of students interested in STEM. **It is important to note that the number of ASNS students Enrollment in 2015 (385) exceeds the projected measure of the College Strategic plan that sets 377 the number of students participating in the ASNS degree by 2015 (outcome 2, G).**

KCC Commitments – Outcome 2: Innovation

In the last 4 years, the Math and Science has provided an increasing number of Research Intensive (RI) lecture and laboratory courses in order to provide students with research skills gained through applying the scientific methods through hands-on projects. The power of RI designation courses is the ability to provide research experience to students within existing courses. Six lecture and laboratory courses are currently offered with a RI designation, and the enrollment in these courses has steadily increased over the years, providing evidence that students are interested in conducting research and value such experience. Figure 4 shows the increase of enrollment in RI courses since their implementation in 2013.

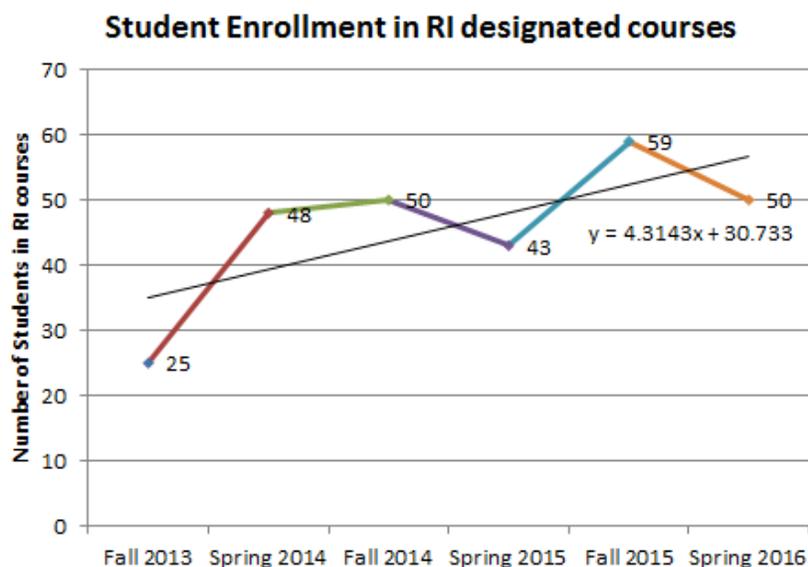


Figure 4: Student Enrollment in RI designated courses

The positive slope value of the linear regression applied to the student enrollment data in RI courses (4.3) confirms the increasing amount of students interested in participating in research-based laboratory and courses.

In addition to RI designated courses, the Math and Science department led the implementation of research courses for ASNS students: SCI 295. These courses provide students with the additional opportunity to conduct their own research of interest with the supervision of a faculty member. To this date, nine topics of research are provided to students. Similar to the RI enrollment trend, Figure 5 shows how an increasing number of students are interested and willing to engage themselves in STEM research projects.

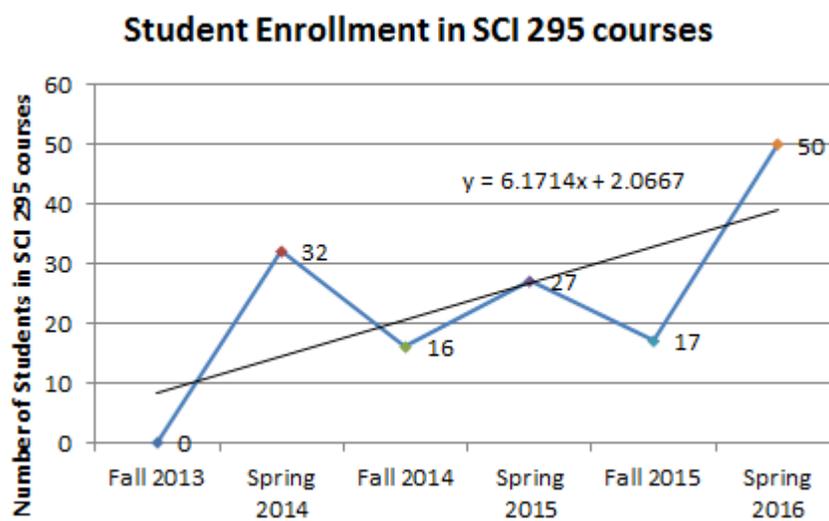


Figure 5: Student Enrollment in SCI 295 designated courses

These data suggest that the ASNS program is fulfilling students' needs by offering innovative education models to its students. Undergraduate research experience is an opportunity that ASNS students welcome and embrace, and other colleges have begun to implement it as well. The importance and value of undergraduate research is seen in the fact that the 2015-2021 Strategic Plan of the College includes the number of ASNS students participating in undergraduate research as one of its measured outcomes.

Current Situation: Internal

Strengths

Strengths of the ASNS degree program are its demand and effectiveness, both of which were "healthy" for all three years. Several initiatives funded by the National Science Foundation (NSF) grants were implemented over the past several years and contributed to the success of the program. A group of very engaged faculty members invested a lot of time and effort to implement the strategies that have been shown to promote student success. These NSF grant-funded strategies and activities helped Native Hawaiian and all ASNS students achieve success (Degree Completion) in the program. These initiatives included: scholarships, peer mentoring, Peer Led Unit Study (PLUS), undergraduate research experience (URE), internships and advising. All mentoring activities in the past 6 years were grant funded. This mentoring contributed immensely to student success in the challenging ASNS major courses and thus contributed to persistence in the ASNS degree program.

Threats

Two funding issues threaten the program's effectiveness: loss of NSF grant funding and Math and Science department budget decreases. Despite efforts to renew federal grant funding from the NSF, much of the grant funding will be ending by summer 2016. This will completely terminate all student mentoring for ASNS courses (peer mentoring and PLUS mentoring). Unless the College can find a way to institutionalize the mentoring programs, an increase in attrition rates may follow. This is likely to affect the effectiveness of the ASNS degree program in the future.

In addition to the loss of grants, the budget in the Math and Sciences department has dramatically decreased. In the 2015 ARPD, the effectiveness was healthy but following trends were noted: a 2% drop in student success in ASNS degree courses; a 5% drop in Spring to Fall persistence, and a 7% drop in Fall to Fall persistence. These drops correlated with the decrease in the department's operating budget. Specifically, the department's operating budget during this period was only 62% of the previous year's budget; it fell from \$96,670 in 2013-2014 to \$59,730.00 for 2014 - 2015. More than half of the ASNS courses (18/34, or 53%) are either lab courses or other applied courses that require materials to be purchased through the department budget. Since the budget has been cut so severely and other purchasing limitations were

instituted, materials that were needed to provide fully engaging course activities could not be purchased.

Another significant internal threat is the ongoing lack of space dedicated to Natural Sciences use. Appropriate laboratory spaces which allow adequate water flow, drainage, ventilation, bench space, preparation space, and storage are not available. Some of the available lab space has roof leakage issues and the air conditioning units are in disrepair. These issues threaten lab equipment and supplies. In addition, the APT laboratory technician staffing for all the laboratories offered in the Math and Sciences department is very limited. In a typical semester the department offers 80-100 laboratory sections serving 1600 – 2000 students. All of the preparations for these lab sections are handled by only two APTs. This is unsustainable and has significant safety and compliance implications. This CPR has identified this lack of dedicated space as a factor that will continue to limit the potential expansion of this program of study. Classes offering undergraduate research (RI and SCI 295 classes) are limited by the lack of space allocated to do undergraduate research. The College must be committed to an increase in space dedicated to Natural Sciences lab courses and undergraduate research.

Faculty positions left vacant due to resignation or retirement should be considered for recruitment. The number of MATH FTEs has decreased to a number that is unhealthy for the program and needs attention.

Current Situation: External

The following outcomes and performance measures of the KCC Strategic Plan 2015 – 2021 directly address the goals of the ASNS degree program.

Outcome 1: Hawa'i Graduation Initiative: Focus on Student Success

- (e) Increase annual STEM certificate and degree completers at KCC and UH 4-year by 5% from 166 to 243
- (g) Close Native Hawaiian success gaps in percent of all and STEM degree and certificates, and 4-year transfer.
- (h) Close Filipino success gaps in percent of all and STEM degree and certificates, and 4-year transfer.
- (i) Close Pacific Islander success gaps in percent of all and STEM degree and certificates, and 4-year transfer.
- (ii) Close Pell Recipient success gaps in all and STEM degree and certificates, and 4-year transfer.

Outcome 2 Hawaii Innovation Initiative: Productive Futures for Students, Faculty and Staff

- (g) Increase the annual number of students participating in the ASNS degree by 6% from 356-535.
- (h) Increase the number of ASNS students transferring to UH 4-year campuses by 6% from 42 to 64.
- (i) Increase the annual number of students completing ASNS undergraduate research experiences and research internships by 10% from 70 – 136,
- (j) Increase the annual number of students completing the ASNS degree by 10% from 30 to 60.

Assessment Results for Program SLOs

New program SLOs became effective in Fall of 2014, and three of the four SLOs have been assessed between Fall 2014 and Spring 2015, with the fourth SLO scheduled for assessment in Spring 2016.

SLO#	Student Learning Outcome	Year and Method	Results - % competency achievement	Actions
1	Apply Scientific knowledge, skills and methods to problem solving, with a special emphasis on Hawaii, where appropriate.	2014 – Relevant exam questions from ASNS courses	Biology: 77.8% Engineering: 80.2% Physics: 71.2% Mathematics: 60.3%	Requested Physics position; Requested Math position; Applied for grant to improve math success.
2	Utilize analytical reasoning or mathematical techniques to describe physical or biological phenomena.	2014 – Relevant exam questions from ASNS courses	Biology: 82.8% Engineering: 81.5% Physics: 69.4% Mathematics: 63.2%	
3	Conduct inquiry-based investigations using computer algorithms, the engineering design reviews, and/or the scientific process.	2015 – Evaluate student research projects at URE Expo	Biology: 100% Engineering: 100% Physics: 100% The overall average was 3.33/4.00 with 2.00/4.00 considered competent.	Request institutionalization of URE coordinator; Continue to request space for URE efforts.
4	Critically review discipline-specific literature and effectively communicate unbiased research orally and in writing.	2016 – in progress		

For both SLO #1 and SLO #2, the mathematics courses had the lowest percentage of competency achievement, followed by the physics courses. Engineering and Biology experienced a higher level of competency achievement by a considerable margin. A particularly alarming trend is that in their Course Learning Reports, instructors of physics classes and engineering classes commented on the lack of student preparation in the fundamental math skills needed in their

courses. These instructors spend considerable time getting students caught up with or reviewing the necessary math skills. As a result, the program requested hiring a new math faculty member to collaborate with the science and engineering faculty members to ensure that they are properly prepared with the mathematics skills needed for the ASNS classes. This request was not approved.

SLO #3 was assessed during the Spring 2015 “SURF” (Stem Undergraduate Research Fair) in the college cafeteria. A slightly modified version of the Inquiry and Analysis VALUE rubric was used to evaluate undergraduate research posters. The rubric articulates fundamental criteria for elements associated with inquiry and analysis, with performance descriptors at each level. The VALUE rubrics are intended for evaluating student learning rather than for grading. Scoring a 2.00/4.00 on the rubric indicates second-year college level research project, and was considered “competent” for this evaluation.

Twenty-six individual research projects were evaluated from nine different ANSN majors courses: 17 projects from the biological sciences, 5 from engineering, and 4 from physical sciences. Eleven instructors participated in the evaluation. The individual scores were averaged and 100% of the posters averaged 2 or higher on the Inquiry and Analysis VALUE rubric. The overall average was 3.33 for all posters, with the physical science and engineering posters scoring slightly higher than the biological sciences posters. Of the 26 posters, only one had an average score of 2/4, with the remaining posters averaging 3 or higher.

As mentioned in Part I, the following requests were made as a recommendations were made as the result of P-SLO assessment.

Lack of success in Math courses, plus observation by some upper level ASNS Physics and Engineering course instructors that students’ math skills are lacking. (P-SLO analysis)	New Math faculty position requested.	Not approved. Lack of success in Math courses continues to hurt the ability for students to persist and complete their ASNS degree and/or transfer to the 4-year schools.
A disproportionate number of physics classes were taught by lecturers, and hiring a full time physics instructor would help increase the success rates for physical science and engineering concentrations of the ASNS degree. (P-SLO analysis)	New Physics faculty position requested.	Position approved and faculty member hired. This position was approved, and a full-time Physics faculty member was hired and started in Fall 2015.
Seek grants that can cover initiatives to improve success in the MATH discipline and to continue the implementation of existing initiatives to improve student success and retention. (P-SLO analysis)	STEM faculty members applied for a Math grant.	Grant funding awarded to develop, implement, and assess the efficacy of a Math Emporium Immersion Model (MEIM) treatment that allows students to reach calculus level mathematics in one semester.

Part VII: Tactical Action Plan, 2016-2019

Kapiolani Community College Strategic Plan Outcomes and Performance Measures, 2015 – 2021.	ASNS Strategies
<p>Outcome 1 Hawai'i Graduation Initiative: Focus on Students</p> <p>Outcome 2 Hawaii Innovation Initiative: Productive Futures for Students, Faculty and Staff (measured by ARPD data)</p> <p>(j) Increase the annual number of students participating in the ASNS degree by 6% from 356-535.</p> <p>(k) Increase the number of ASNS students transferring to UH 4-year campuses by 6[^] from 42 to 64.</p> <p>(l) Increase the annual number of students completing ASNS undergraduate research experiences and research internships by 10% from 70 – 136,</p> <p>(m) Increase the annual number of students completing the ASNS degree by 10% from 30 to 60.</p>	<p>Institutionalize peer mentoring program at the STEM Center</p> <p>Institutionalize and solidify STEM URE through:</p> <ul style="list-style-type: none"> • APT position URE coordinator • Dedicated space for URE • Additional lab technician <p>Hire a Math full-time faculty position, since lack of math skills is affecting student persistence and degree completion.</p> <p>Institutionalization of peer and PLUS mentors for ASNS courses.</p>

Positions Responsible	Synergies with other programs, units, emphases and initiatives
<p>Faculty Department Chairs APT Staff STEM Center staff Assessment Coordinator(s) Secretaries Dean</p>	<p>Maida Kamber Center CELTT, Library, & Testing, Achieving the Dream initiative & Title III, Student Services, CTE and Health Academic Clusters, BLT Department, Ka'ie'ie and other university pathways, OFIE and Service Learning, Business Office, Human Resources Office</p>

Part VIII. Resource and Budget Implications

The number of ASNS majors has been growing at a steady rate, and the College's goal is for continued growth over the next five years. Funds will be needed to continue to support the disciplines enrolling large numbers of intended transfer students, which include all concentrations in the ASNS. Funds and resources will be needed to support the following ARPD data-driven needs:

- 1) Funding to institutionalize the STEM Center activities is needed. Funds are needed for the STEM Center monitors, peer mentoring, PLUS mentoring.

- 2) New APT Position for Undergraduate Research Support is needed to continue the work of coordinating the undergraduate research initiatives on campus so that the burden does not fall solely on the faculty mentors. Several KCC STEM faculty members invest countless hours mentoring the URE students in preparation for national conferences, competitions, and in classroom settings and logistical support is needed. In addition, the support position could also serve as a lab technician for URE initiatives.
- 3) Space for students to conduct research is desperately needed. Undergraduate research experience (URE) has been identified as a best-practice for student transfer and success and has been described at length in grant reporting as a key factor in the success of the KCC STEM program.
- 4) New mathematics faculty position is needed to support student learning outcomes and prepare the students for the math-heavy science and engineering courses. Looking ahead, all faculty positions left vacant due to resignation or retirement should be considered for recruitment. Enhanced faculty leadership will help to better position the college for continued growth.
- 5) The Math and Sciences budget needs to be restored so that the ASNS courses can have supplies to provide rigorous science and engineering instruction with engaging course activities.
- 6) Laptops for some of the laboratory classes need to be replaced. Some of these laptops have been in use for more than 7 years. These laptops are needed for data gathering and analysis in the laboratory, RI, and SCI 295 classes.
- 7) The loss of NSF grant funds will completely terminate all student mentoring for ASNS courses (peer mentoring and PLUS mentoring). Unless the College can find a way to institutionalize the mentoring programs, an increase in attrition rates may follow. This is likely to affect the effectiveness of the ASNS degree program in the future.
- 8) Other resources to support program goals around transfer, persistence, and graduation will be needed.