Kaua`i Community College
Annual Program Review Update (APRU) for (Natural Science)

At a minimum, each program or unit Annual Program Review Update shall include measures described in UHCCP 5.202. Additional measures may also be used for program or unit assessment.

Program or Unit Mission Statement

Program Description

The purpose of the Associate of Science in Natural Science (ASNS) degree is to address the needs of students interested in science, technology, engineering, and mathematics (STEM). Students can use the AS degree in Natural Science to better market their science background or in preparation for transfer to a four-year institution. The ASNS in Biological Sciences provides a clear pathway to properly prepare students for transfer with core introductory courses and labs in biology, chemistry, and physics typically required in the first two years of a broad range of biological science baccalaureate degrees at four-year universities. The ASNS in Physical Sciences provides a clear pathway to properly prepare students for transfer with core introductory courses and labs in chemistry, mathematics, and physics typically required in the first two years of a broad range of physical science baccalaureate degrees at four-year universities.

Part I. Program Description

Date of Last Comprehensive Review	N/A program initiated in 2013 and provision to established 2018
Date Website Last Reviewed/Updated	
Target Student Population	Transfer students in STEM
External Factor(s) that Affected the Program or Unit	Articulation with UH 4-year institutions for transfer.

Part II. Analysis of Quantitative Indicators

The Overall Program Health is Cautionary.

Demand: The demand for the ASNS program is Healthy as shown in *figure 1* below. Enrollment continue to grow with 60% increase from the previous year (from 20 to 32 majors). This trend is expected to continue as we are working to market the program. The percentage of full-time students is 41% in Fall 2017 and 44% in Spring 2018. Although higher than the college's overall data (27% in Fall 2017 and 22% in Spring 2018). These numbers are about the same for the past three years, and is an area we can continue to work on, same as all other programs on campus.

Figure1: Demand Indicators

Demand Indicators		Program Year 15-16	Program Year 16-17	Program Year 17-18	Demand Health
1.	Number of Majors	19	20	32	
1a.	Number of Majors Native Hawaiian	4	8	7	
1b.	Fall Full-Time	38%	47%	41%	
1c.	Fall Part-Time	63%	53%	59%	
1d.	Fall Part-Time who are Full-Time in System	6%	5%	3%	
1e.	Spring Full-Time	52%	48%	44%	
1f.	Spring Part-Time	48%	52%	56%	**Healthy**
1g.	Spring Part-Time who are Full-Time in System	0%	0%	16%	
*2.	Percent Change Majors from Prior Year	23%	8%	60%	
3.	SSH Program Majors in Program Classes	74	115	218	
4.	SSH Non-Majors in Program Classes	307	1,164	1,051	
5.	SSH in All Program Classes	381	1,279	1,269	
6.	FTE Enrollment in Program Classes	13	43	42	
7.	Total Number of Classes Taught	15	34	34	

Efficiency: Efficiency is rated as Cautionary, mainly because we are at half capacity in our program classes as shown in *Figure 2*. To understand this efficiency indicator, we are to look at the program faculty and courses.

In our last APRU, we discovered that our program faculty number and the list of program courses needed revision. We had worked with our VCAA to make corrections in these areas. We are almost perfect in the way we counted these numbers. *Figure 3* shows that we are counting our Agriculture instructor as 0.5 FTE in our program, but he did not teach any of the program courses. He should have been counted in the PBT program that he actually is the coordinator of. One can speculate that because PBT is stopped out, that this faculty member needed to be counted somewhere so he was assigned half Natural Science and half Liberal Arts (the two programs in the division). This thinking comes about because the last APRU, when we fixed our count, had a reported number of faculty of 2.8 (rounded from 2.75) and now reporting in as 3 (rounded from 3.25). Thus, the difference of 0.5 TE. Our faculty count should be at 2.75.

Figure 4 shows that we are counting BIOL 100 and BIOL 100L in our program. Those are not program courses, and will have to be taken out of our list for the future count.

The ASNS has three tracks: Physical, Biological, and Engineering. Not all courses are required by each of the concentration, except for Chemistry 161/161L that is consistently close to being at capacity. Only Engineering students are required to take EE 160 (4 students), Math 243 (6 students, 2 early college) and Math 244 (4 students), so enrollment in these courses are naturally low until we have recruited a full cohort of engineering students. PHYS 170/170L (8 students) and PHYS 272/272L (8 students) are required for Engineering and Physical Science track so these enrollment numbers are not as bad as the previous set, but these have calculus pre-requisite so students have to finish their math before entering these courses. BIOL 171/171L and BIOL 172/172L are specifically for Biological track, so these courses are reasonably less than full-capacity. Luckily, we have more Biological Science students and these courses also serve as transfer-level marine biology courses (cross-listed with MARE) so we have managed the consistent enrollment of around 20 students.

One plan of improvement arriving from this analysis of data is the recruitment of Physical Science and Engineering students. The other is creative scheduling (as in our accreditation's QFE) to get students to their targeted program courses and to complete their degree on-time. In Fall of 2018, we've piloted a STEM cohort, consisting of two 8-week math courses, as well as a semester long Chemistry course and STEMinar course. With this innovation, students placing into college level math can get calculus ready in only one semester by taking College Algebra and Precalculus both in their first semester of college. In Spring 2018, students are able to take Math 241 and 242 (Calculus 1 and 2) in 8wk/8wk model. This resulted in students finishing Calculus 2 at the end of their first year, in alignment with all university STEM-ready students. Preliminary data from STEM cohort is promising, and a detailed analysis will be included in the next APRU cycle. We are working on revising this cohort model for 2019-2020 for continue success.

Figure 2: Efficiency Indicators

	Efficiency Indicators	Program Year			Efficiency Health
		15-16	16-17	17-18	
8.	Average Class Size	11	12	12	
*9.	Fill Rate	49.3%	51.6%	53.2%	
10.	FTE BOR Appointed Faculty	5	3	3	
*11.	Majors to FTE BOR Appointed Faculty	3	6	10	
12.	Majors to Analytic FTE Faculty	19	4	6	
12a.	Analytic FTE Faculty	1	5	5	Cautionary
13.	Overall Program Budget Allocation				
13a.	General Funded Budget Allocation				
13b.	Special/Federal Budget Allocation				
13c.	Tuition and Fees				
14.	Cost per SSH				
15.	Number of Low-Enrolled (<10) Classes	7	13	14	

Figure 3: Program Faculty

REVIEW_YEAR	IRO_INSTITUTION	CAMP	PERSON_UID	FULL_PART	TYPE	NAME	STAT	FTE_TOT	TITLE	TEN	YR	MON	HRIS_NARRATIVE	PROGRAM_OWNER
2018	KAU	KU	1017279	FULL	F	Hannawald, Michael W.	A	0.5	INSTRUCTOR, CC, 9-MO	FPP	2017	10	CHEMISTRY	Natural Science
2018	KAU	KU	487473	FULL	F	Kalk, Jonathan W.	A	0.5	ASSOC PROF, CC, 9-MO	FTN	2017	10	MATHEMATICS	Natural Science
2018	KAU	KU	424842	FULL	F	Keating, Kelene N.	A	0.5	INSTRUCTOR, CC, 9-MO	FNT	2017	10	OCEANOGRAPHY	Natural Science
2018	KAU	KU	1341018	FULL	F	Taylor, Stephen V.	A	0.25	ASSOC PROF, CC, 9-MO	FTN	2017	10	PHYSICAL SCIENCE	Natural Science
								3.25						

* Sharad should not be included in Natural Science. He was assigned into PBT.

* Brad 's teaching load is only 50%, and the other 50% is grant work

Figure 4: Program Courses

Semester	IRO_INSTITUTION	UH IRO Organization	SUBJECT	COURSE_NUMBER	TITLE_SHORT_DESC	PROGRAM_OWNER
Spring 2018	KAU	General & Pre-Professional Instr	BIOL	100	Human Biology	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	BIOL	100L	Human Biology Lab	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	BIOL	110V	Projects in Biol	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	BIOL	171	Intro to Biology I	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	BIOL	171L	Intro to Biology Lab I	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	BIOL	172	Intro to Biology II	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	BIOL	172L	Intro to Biology Lab II	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	CHEM	161	Gen Chemistry I	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	CHEM	161L	Gen Chem Lab I	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	CHEM	162	Gen Chemistry II	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	CHEM	162L	Gen Chem Lab II	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	EE	160	Programming for Engineers	Natural Science
Spring 2018	KAU	Career & Technical Instr	ICS	111	Intro Computer Sci I	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	MATH	140X	PreCalculus	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	MATH	205	Calculus I	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	MATH	206	Calculus II	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	MATH	231	Calculus III	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	MATH	232	Calculus IV	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	PHYS	170	General Physics I	Natural Science
Fall 2017	KAU	General & Pre-Professional Instr	PHYS	170L	General Physics I Lab	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	PHYS	272	General Physics II	Natural Science
Spring 2018	KAU	General & Pre-Professional Instr	PHYS	272L	General Physics II Lab	Natural Science

* BIOL 100/100L are not a program courses.

Effectiveness: Effectiveness is rated as Cautionary, mainly because we had a decrease in our Fall to Spring persistent as shown in figure 5. We went from 74% in 2016-17, to 66% in 2017-18. This data is consistent with the college's overall data, and is an area to work on. We hope that our cohort models will help students with a sense of belonging and having the support from their peers will help with persistence. One area to be proud of is our success rates in our STEM courses. These are consistently at 80%. The high success rates might be contributed to our Academic Support Center, and our 11-month grant funded faculty who provided support to STEM students as part of his workload. Fall to Spring persistence in the PHYS stream has been 88% and 79% in the 2017-2018 and 2018-2019 school years respectively. Data from student reviews found that students felt the ability to work in the Academic Support Center was a major reason for success in the class. This also provides students with an informal meeting place and location to work together as a science community. There has also been a request to provide an online forum where students can discuss any problems with the material.

Grant work has included development of a new course (STEMinar) to both inform students about prospective careers in STEM, excite students with hands on activities and a campus facility tour, and support student success in their current science classes. This course was included in the

STEM cohort for its first offering and further discussion will be in our next APRU cycle as this just happened Fall 2018.

Grant work has also involved creating research proposals and connecting students to areas of interest. So far, three proposals for student research have been created, on for working with a local microbiology company, one for working with an Ulu farm, and another has been created to test the effects of leaching plastics (BPA) on plant growth. Two of these proposals remain open and are pending approval of the community organizations. Currently work is underway with the BPA research project and the student has already gained valuable knowledge in proposal writing and project planning. Measurements and a final report are expected by May and the student will be available for presenting at next year's National Diversity in STEM (SACNAS) conference. Future work looks at utilizing science to improve the Taro patch at Kauai Community College. Students will be supported to attend the National Diversity in STEM conference in October of 2019 with the hope that any students involved in research projects will be available to present at the conference. Students not presenting at the conference will be entered into a contest to qualify for an attendance stipend to visit the conference.

Figure 5: Effectiveness Indicators

	Effectiveness Indicators	Program Year			Effectiveness Health
		15-16	16-17	17-18	
16.	Successful Completion (Equivalent C or Higher)	83%	79%	81%	
17.	Withdrawals (Grade = W)	6	20	21	
*18.	Persistence Fall to Spring	75%	74%	66%	
18a.	Persistence Fall to Fall	44%	16%	38%	
19.	Unduplicated Degrees/Certificates Awarded Prior Fiscal Year	2	3	2	
19a.	Associate Degrees Awarded	2	3	3	
19b.	Academic Subject Certificates Awarded	0	0	0	
19c.	Goal				Cautionary
19d.	Difference Between Unduplicated Awarded and Goal				
20.	Transfers to UH 4-yr	2	0	6	
20a.	Transfers with degree from program	0	0	1	
20b.	Transfers without degree from program	2	0	5	
20c.	Increase by 3% Annual Transfers to UH 4-yr Goal				
20d.	Difference Between Transfers and Goal				

Figure 6: Other Indicators

Distance Indicators		Program Year			
		15-16	**16-17**	**17-18**	
21.	Number of Distance Education Classes Taught	1	3	1	
22.	Enrollments Distance Education Classes	11	20	6	
23.	Fill Rate	73%	40%	40%	
24.	Successful Completion (Equivalent C or Higher)	73%	80%	17%	
25.	Withdrawals (Grade = W)	0	2	2	
26.	Persistence (Fall to Spring Not Limited to Distance Education)				

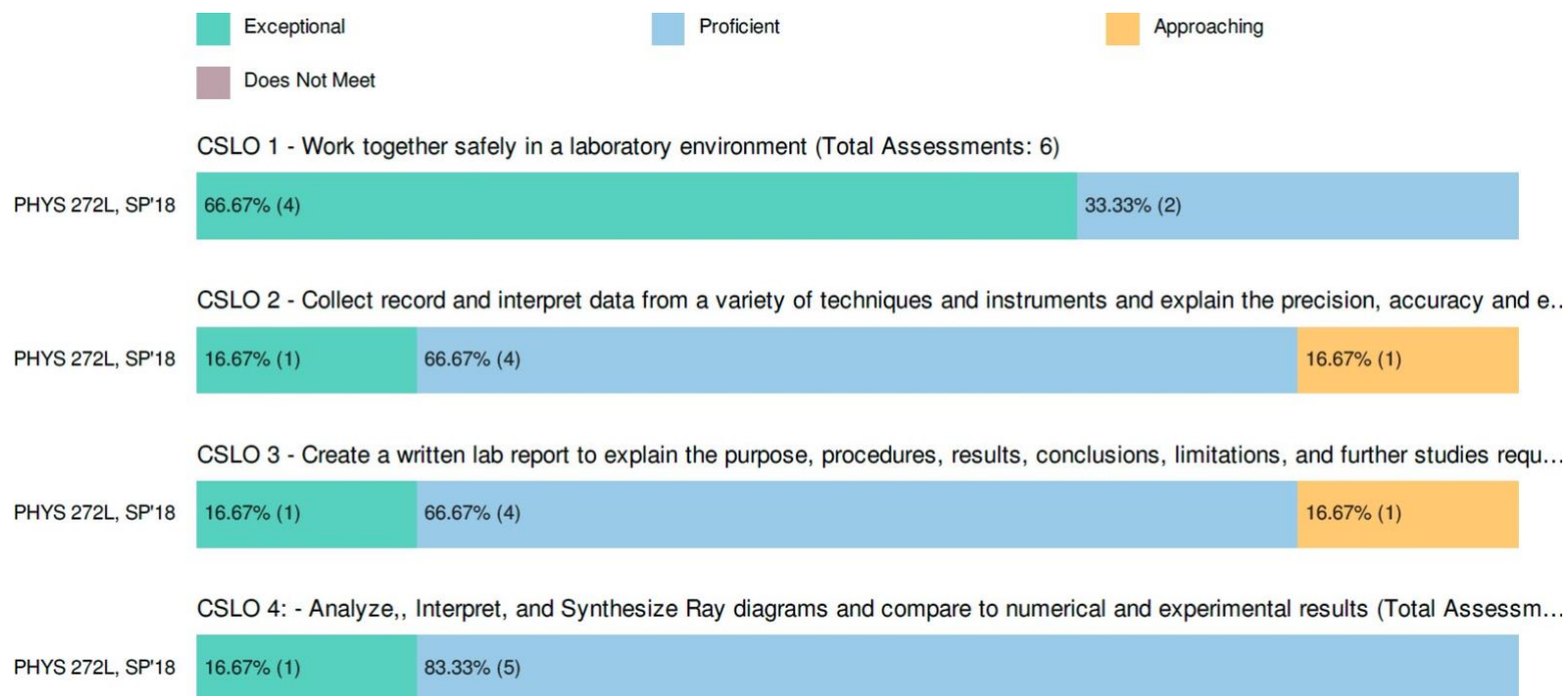| Performance Indicators		Program Year			
		15-16	**16-17**	**17-18**	
27.	Number of Degrees and Certificates	2	3	3	
28.	Number of Degrees and Certificates Native Hawaiian	0	1	0	
29.	Number of Degrees and Certificates STEM	2	4	6	
30.	Number of Pell Recipients[1]	2	2	1	
31.	Number of Transfers to UH 4-yr	2	0	6	

Figure 6 shows that we only have one distance education course (EE 160). This was low enrolled and the success rate came in at 40%. Definitely an area to work on for the program. As far as the number of degrees/certificates, we are expecting these numbers to go up significantly as our enrollment increases, as our effort put forth in shortening STEM math path, our cohort model, as well as a couple revisions in our program requirements.

Part III. Assessment Data (EP 5.202)

PSLO	Assessed this APRU Cycle (Y or N)	Findings	Improvements Implemented	Next Assessment Date
1. Analyze data effectively using currently available technology.	N All CSLOs in Chem 162L & Phys272L			2018-2019
2. Communicate scientific ideas and principles clearly and effectively.	Y Phys 272L SLO#3	100% MET		2018-2019
3. Analyze and apply fundamental mathematical, physical, and chemical concepts and techniques to scientific issues.	Y Phys 272L SLO#3	100% MET		2018-2019
4. Apply fundamental concepts and techniques in their chosen natural science field of study, such as biology, chemistry, engineering, physics, etc.	N All CSLOs in BIOL, CHEM, PHYS, EE as required by concentration.			2018-2019

 Figure 7 below shows the data collected for PHYS 272L assessment of CSLOs, specifically CSLO#3 was used for PSLO#2 and PSLO#3. The benchmark was set so that meeting the CSLO means approaching, proficient, or exceptional. So, 100% of students assessed met the benchmark.

Figure 7: CSLO Assessment for PHYS 272L

Legend: ■ Exceptional ■ Proficient ■ Approaching ■ Does Not Meet

CSLO 1 - Work together safely in a laboratory environment (Total Assessments: 6)

PHYS 272L, SP'18 — 66.67% (4) | 33.33% (2)

CSLO 2 - Collect record and interpret data from a variety of techniques and instruments and explain the precision, accuracy and e..

PHYS 272L, SP'18 — 16.67% (1) | 66.67% (4) | 16.67% (1)

CSLO 3 - Create a written lab report to explain the purpose, procedures, results, conclusions, limitations, and further studies requ...

PHYS 272L, SP'18 — 16.67% (1) | 66.67% (4) | 16.67% (1)

CSLO 4: - Analyze,, Interpret, and Synthesize Ray diagrams and compare to numerical and experimental results (Total Assessm...

PHYS 272L, SP'18 — 16.67% (1) | 83.33% (5)

Part IV. Results of Prior Year Action Plans (UHCCP 5.202)

Action Plan	Anticipated Outcome	Actual Outcome
Market the program to increase enrollment through various efforts	Increased in # of majors	# majors increase
Host STEM student meeting once per semester	Student meetings	STEMiar course (SCI 170) & Chemistry Club
Develop program assessment plan	Program assessment plan	Plan developed and beginning implementation

Part V. Analysis of Alignment with CPR

Goal/Strategic Goal or Priority**	Achieved (Y or N)?	Benchmark	Desired Outcome	Actual Outcome	Unit of Measure
Increase # of majors	Y	+ % change		+ 60%	% change
Increase # of graduates	N	+ % change		Zero change	% change
Increase Transfers	Y	+ % change		Zero to 6 transfers!	% change
Increase high school grads enrolling at KCC	No data yet	+ % change		No data yet	% change
Increase in NH in program	N	+ % change		Decrease from 8 to 7 count	% change
Develop and implement program assessment plans	Y	Has a plan & beginning implementation		Developed and began assessment.	N/A

**All Strategic Goals and Priorities are Aligned to the College Mission.

Since this is a new program, we continue to put our effort into marketing the program to increase in enrollment (including NH and recent high school graduates), increase in graduates, increase in transfer (with or without degree). We continue to find better ways to assess the program and implement program assessments.

Part VI. Resource Request(s) for next year (from CPR Plan for your program or unit, or one(s) developed in Part V above if CPR was completed prior to 2018).

If no resources are being requested, place an "X' here._____X_____