Electronics Technology (ETRO)

Kaua`i Community College
Five Year Comprehensive Program Review (CPR)

Program Name Electronics Technology

Assessment Period: 2019 - 2023

Program or Unit Mission Statement (UHCCP 5.202)
The Electronic Technology program's mission is to produce graduates who are technically competent, can communicate and work with others effectively, demonstrate responsible citizenship, leadership and an awareness of the global context of their work.

College Mission Statement (UHCCP 5.202)
Kauaʻi Community College (KCC) is a kahua that inspires, engages, and empowers learners and educators to enrich our community and our world.

How does your campus program or unit support the college mission?
The program support's KCC's mission by providing a space where students can learn electronics concepts and apply those concepts in the lab, receive guidance and wisdom from knowledgeable faculty, and be empowered to share their knowledge with and mentor others.

Part I. Executive Summary of Program Status

The Electronics Technology program saw a peak enrollment of 21 students in the 2020 – 2021 academic year. However, enrollment decreased to just 16 students towards the end of the 2022-2023 academic year (AY), similar to the enrollment at the beginning of 2019.

In 2021, the number of full-time instructors for the program fell from 2 to 1. Then, in 2022, the last remaining full-time instructor and program coordinator resigned. The program has been without a full-time instructor and coordinator since. For the last year of this report period, all ETRO classes were taught by lecturers.

The program has always placed a strong emphasis on recruiting students. However, in addition to recruiting students, the program is intending to recruit two full-time instructors (one serving as program coordinator) to help run the program and increase enrollment.

The program intends to increase enrollment by increasing its recruiting efforts. One initiative the program intends to undertake is to seek facilities improvements to support more student projects. If more projects can be done at the program's facilities, this may lead to higher student recruitment while also showcasing more to prospective students regarding what they will learn. Another initiative the program intends undertake is to participate in more outreach events, create more demos, and offer Early College classes.

Part II. Program Description (UHCCP 5.202)

Number of Faculty and Staff	Faculty (FT): 0 (as of 2022 – 2023 Academic Year)
	Faculty (Lecturers): 4
	Staff: 0
Date Website Last Reviewed/Updated	5/24/23
Brief History of Program	The Electronics Technology program was started at KCC in 1985 with the help of Senator Daniel K. Inouye to support Pacific Missile Range Facility (PMRF)'s operations and fulfill state initiatives. Since then, the program has grown and acquired additional equipment including laser cutters and engravers, a laser lab, a 3D printer, a custom circuit board plotter, in addition to various programming, networking, and microcontroller related tools and devices. The program has participated in several projects including solar car races, CubeSat, model rocketry, and building and underwater observatory.

	For a time, the program participated in and supported the pre-engineering program at KCC and taught entry level engineering classes such as EE 160, EE 211, and EE 213. The program is becoming more active in its recruiting efforts, including participating in KCC's first ever Find Your Future event in February 2023. The program expanded its recruiting efforts and offer Early College classes in the future.

For Instructional Programs ONLY

Graduate Occupation or Transfer Options	Electronics Technician, IT Technician, transfer to Bachelor of Science Electronics Technology 4-year degree
Special Admission Requirements	none
Credentials Offered	AS Electronics Technology CO Programming CO Network Security CO Computer Support CA Electronics Technology CA Network Administration and Security Cisco I Cisco II
Current Program Articulation Agreements (Institution and Expiration Date)	Institution:
	Expiration Date:
	Institution:
	Expiration Date:
Distance Education Courses Offered	none
Early College Courses offered (total number of sections/high school)	
Distance Education Programs offered	none
Current Advisory Board Members/Employer and last meeting date	Member Name:
	Employer: Manu Kai, PMRF, Lockheed Martin, Solaris, various military subcontractors

	Last Meeting Date: Fall 2018
Employer Internships	None currently. An internship program is in the works and is slated to begin very soon. Details will follow hopefully on the next APRU.

Part III. Analysis of Quantitative Indicators

Overall Program Indicators

Trends of the program over the past five years have displayed a decline in all three main program indicators (demand, efficiency, and effectiveness) and are likely associated with circumstances occurring during the pandemic. However, those trends have stabilized from last year to this year and strategies are in place to improve the overall status of the program.

The program had a successful debut at KCC's first Find Your Future Event in February of 2023 and expect for enrollment to pick up in fall 2023.

Demand Indicators

New and Replacement Positions (County Prorated) have historically displayed a low number, however working collaboratively with PMRF, the third largest employer on Kauai have open positions for eighteen Electronic Technicians and four IT/Cyber positions currently available. The program also works with other various community partners in need of employees.

Fall full-time has recently declined from 57% 2021-22 to 28% 2022-23 with an increase in part-time 43% 2021-22 to 72% 2022-23. Spring full-time shifted in the opposite direction with a slight increase from 31% 2021-22 to 33% 2022-23 and a slight decrease from 69% 2021-22 to 67% 2022-23.

#	Demand Indicators	2018-19	2019-20	2020-21	2021-22	2022-23
1	New & Replacement Positions (State)	180	175	134	102	103
2	New & Replacement Positions (County Prorated)	5	► 5	▼ 4	▼ 2	► 2
3	Number of Majors	16	▲ 17	▲ 21	▼ 20	▼ 15
3a.	Number of Majors Native Hawaiian	5	▼ 4	▲ 5	▼ 4	► 4
3b.	Fall Full-Time	22%	58%	50%	57%	28%
3c.	Fall Part-Time	78%	42%	50%	43%	72%
3d.	Fall Part-Time who are Full-Time in System	6%	0%	0%	0%	6%
3e.	Spring Full-Time	50%	47%	56%	31%	33%
3f.	Spring Part-Time	50%	53%	44%	69%	67%
3g.	Spring Part-Time who are Full-Time in System	0%	7%	0%	6%	0%
4	SSH Program Majors in Program Classes	167	176	203	202	157
5	SSH Non-Majors in Program Classes	85	87	109	12	6
6	SSH in All Program Classes	252	263	312	214	163
7	FTE Enrollment in Program Classes	8	9	10	7	5
8	Total Number of Classes Taught	11	▼ 9	▲ 10	▼ 7	▲ 8

Efficiency Indicators

Average class size has been low over these past five years likely due to inadequate promotion of the program and previously having only one FTE instructor unable to effectively promote the program and

overcoming challenges with the pandemic at the same time. The fill rate in 2021-22 at 61% dropped to 47.5% in 2022-23 likely due to the resignation of the FTE faculty and uncertainty of the program. Those results also affected the number of low enrolled classes that increased from 4 in 2021-22 to 7 in 2022-23.

#	Efficiency Indicators	2018-19	2019-20	2020-21	2021-22	2022-23
9	Average Class Size	8	▲ 9	▲ 11	▼ 9	▼ 7
10	Fill Rate	54.50%	▲ 60%	▲ 71.9%	▼ 61%	▼ 47.5%
11	FTE BOR Appointed Faculty	2	2	1	1	0
12	Majors to FTE BOR Appointed Faculty	8	▲ 9	▲ 21	▼ 20	▼ 0
13	Majors to Analytic FTE Faculty	16	17	21	20	15
13a.	Analytic FTE Faculty	1	1	1	1	1
14	Overall Program Expenditures	$188,238	$183,957	$138,451	$112,863	$75,857
14a.	General Funded Budget Allocation	$152,102	$155,398	$137,863	$111,405	$73,814
14b.	Special/Federal Budget Allocation	0	0	0	0	0
14c.	Tuition and Fees	$36,136	$28,559	$588	$1,458	$2,043
15	Cost per SSH	$747	$699	$444	$527	$465
16	Number of Low-Enrolled (<10) Classes	5	5	2	4	7

Effectiveness Indicators

Successful Completion has been relatively stable in the past five years with only a slight decrease from 86% in 2021-22 to 82% in 2022-23. Persistence fall to spring has increased from 68% to 73% in the last years along with Persistence fall to fall 58% to 60%. Degrees awarded have been stable at 4 with the certificates having a decline from 5 in 2021-22 to 2 in 2-2022-23.

#	Effectiveness Indicators	2018-19	2019-20	2020-21	2021-22	2022-23
17	Successful Completion (Equivalent C or Higher)	92%	88%	79%	86%	82%
18	Withdrawals (Grade = W)	0	0	7	0	0
19.	Persistence Fall to Spring	69%	▼ 67%	▲ 71%	▼ 68%	▲ 73%
19a.	Persistence Fall to Fall	62%	44%	45%	58%	60%
20.	Unduplicated Degrees/Certificates Awarded	11	▼ 10	▼ 7	▲ 13	▼ 8
20a.	Degrees Awarded	5	▼ 2	▲ 3	▲ 4	▶ 4
20b.	Certificates of Achievement Awarded	5	▼ 1	▲ 3	▲ 5	▼ 2
20c.	Advanced Professional Certificates Awarded	0	0	0	0	0
20d.	Other Certificates Awarded	10	15	8	15	5
21	External Licensing Exams Passed					
22	Transfers to UH 4-yr	0	3	0	1	0
22a.	Transfers with credential from program	0	1	0	0	0
22b.	Transfers without credential from program	0	2	0	1	0

#	Perkins Indicators	Goal	Actual	Met
29	1P1 Postsecondary Placement	33	100	Met
30	2P1 Earned Recognized Credential	34	75	Met
31	3P1 Nontraditional Program Concentration	11	14	Met

The program has met all 3 Perkins indicators.

#	Performance Indicators	2018-19	2019-20	2020-21	2021-22	2022-23
35	Number of Degrees and Certificates	10	3	6	9	6
36	Number of Degrees and Certificates Native Hawaiian	1	0	0	0	2
37	Number of Degrees and Certificates STEM	11	3	6	9	6
38	Number of Pell Recipients[1]	8	2	3	3	0
39	Number of Transfers to UH 4-yr	0	3	0	1	0

The number of Degrees and Certificates have dropped slightly from 9 to 6 over the past year, however, the Number of Degrees and Certificates Native Hawaiian has increased from 0 to 2. The program anticipates an increase in the number of degrees and certificates awarded from our renewed recruiting efforts beginning spring 2022. These efforts will improve the opportunities to expand the program to include pre-engineering courses as we had in the past. Having an increase in program participation along with additional pre-engineering courses will improve the number of students that transfer to UH Manoa for engineering.

Part IV. Assessment Data (EP 5.202)

The Program Student Learning Outcomes (PSLOs) for the Electronics Technology program as of 10/16/2019 are:

1. Demonstrate analysis, design, and measuring of digital circuits and digital logic fundamentals.
2. Demonstrate practical knowledge of computer hardware, software, and operating systems.
3. Develop skills with algorithmic thinking and demonstrate computer programming language fundamentals such as variables, decision structures, conditional statements, data types and data structures, iterations, and functions.
4. Demonstrate building and configuring internet networks.
5. Demonstrate theoretical and applied knowledge of passive and active electronic components and circuits used in DC and AC electronics.
6. Demonstrate soldering, desoldering, circuit board layout, circuit board fabrication, cable and connector fabrication, electronic component identification, and associated test and measurement principles.

7. Understand and safely apply the physics of light, laser safety, geometric optics, lenses, mirrors, polarizing lenses, interference/diffraction waves, laser physics, optical imaging.
8. Communicate effectively orally, in writing, and by means of various electronic communication devices.
9. Exhibit professional, ethical, and social responsibilities showing respect for diversity and an awareness of contemporary professional, societal, and global issues.

The 5-year assessment plan involved assessing the PSLOs as they are taught in the following courses:

PSLO	Program Courses	Timeline
1	ETRO 143, ETRO 143L	Fall (even yrs)
2	ETRO 187 or ETRO 287	Fall (odd yrs)
3	(ICS 111 or EE 160) and ETRO 280	Spring (odd yrs)
4	ETRO 240B, ETRO 240C	240B - Fall (odd yrs), 240C - Spring (even yrs)
5	ETRO 105, ETRO 106, ETRO 210	105 & 210 - Fall, 106 - Spring
6	ETRO 101	Fall
7	ETRO 161	Spring (odd yrs)
8	ETRO 101	Fall

A few notes about the assessment plan:

1. ETRO 240B and ETRO 240C are *not* required to graduate from the program with an A.S. degree and haven't been offered recently due to staffing shortages and low enrollment. It is possible that ETRO 140B and ETRO 140C (Cisco I & II) could take its place in evaluating PSLO 4. However, this will have to be reviewed internally.
2. The 5-year assessment plan failed to take into account PSLO 9, which may be changed into a form that can be assessed later.
3. The program was without a program coordinator for the year 2022-2023. Therefore, during the time that data would normally be aggregated for this report, there was no coordinator and therefore no formal aggregation of data.

Given the average successful completion rate (C or higher) of 85% from line 17 of the APRD, It is clear that most of the students are passing the classes where most of the PSLOs are being assessed in those classes. Therefore, the program is confident that all PSLOs are being met with the following exceptions:

- For PSLO 4, the program cannot confidently state this PLSO is being met due to these courses not being consistently offered anymore, nor being a graduation requirement for the program. The 5-year assessment plan will be revised to include courses that are more consistently offered.

- PLSO 9's success cannot be measured directly. Professional ethics are taught in ETRO 101 every Fall, but the other behavioral traits are difficult to measure. This will be reviewed by the next program coordinator and a plan we be drafted to either assess or modify this PSLO.

Part V. Curriculum Revision and Review

Course	Last Reviewed	Next Review Date
ETRO 018	2013/14	2024/25
ETRO 101	2021/22	2026/27
ETRO 105	2021/22	2026/27
ETRO 106	2021/22	2026/27
ETRO 140B	2013/14	2024/25
ETRO 140C	2013/14	2024/25
ETRO 143	2023/24	2028/29
ETRO 143L	2023/24	2028/29
ETRO 161	2019/20	2024/25
ETRO 166	2023/24	2028/29
ETRO 187	2013/14	2024/25
ETRO 199V	2008/19	2024/25
ETRO 210	2021/22	2026/27
ETRO 240B	2013/14	2024/25
ETRO 240C	2013/14	2024/25
ETRO 244	2013/14	2024/25

ETRO 245	2013/14	2024/25
ETRO 247	2013/14	2024/25
ETRO 248	2013/14	2024/25
ETRO 257	2013/14	2024/25
ETRO 275	2013/14	2024/25
ETRO 280	2013/14	2024/25
ETRO 287	2021/22	2026/27

* Last reviewed dates taken from *Comprehensive List of Planned 5-Year Course Reviews* spreadsheet. Future review dates calculated based off of actual completion dates.

Part VI. Survey Results

No surveys have been conducted by the Electronics Technology program during the time-period of this report. The program intends to conduct more surveys in the future.

Part VII. Financials

Fiscal Year	Budget
2023/24	**$3622 / academic year**
*prior years unavailable	

It appears that the budget has fallen behind our operating / upgrading expenses. The program will examine whether requesting the board to approve fees could make up the difference.

Category	Current Resource(s)	What is needed?	Justification
PERSONNEL			
Positions (Faculty)	none	2 FTE tenure-track (one to serve as coordinator)	The program requires two instructors to divide the teaching responsibilities, program coordinator responsibilities, maintenance / facilities management, and curriculum

			development and review. The program was started with the intention of being a 2 FTE program and has been that way for a good portion of the program's existence.
Positions (Staff)	none	1 Full-time technician	The program possesses a large array of specialty equipment that require special maintenance. A professional technician would be able to look after these machines and keep them in good operating condition, freeing up time from the instructors to focus on other responsibilities. The technician would be able to support *all trades* and maintain equipment across disciplines
	none	1 student worker (lab assistant)	1 student worker is needed to keep clean & tidy, organize the labs, and keep track of inventory. Without a full-time coordinator, the labs have fallen into disarray and a student worker would help to bring the labs into better operating condition. 20 hrs / wk is recommended in the beginning. However, as the labs become better maintained, the hours may be reduced.
OPERATING			
Supplies		$3000 / semester	Consumables including soldering kits, solder, flux, 3D filament, acrylic sheets, chemicals, connectors, batteries, chips, passive components, PPE, etc.
Equipment			
Space/Facilities		Independent AC system	In order to host projects, or perform machine maintenance, time will have to be spent in the DKI TECH building outside of class time. It is not economically feasible to run

			the A/C outside of class time given the fact that our building is connected to the main campus chiller. However, given the climate, A/C is necessary for a safe, comfortable, and humane working environment. Therefore, the program requests an upgrade to its facilities to have an independent A/C system allowing it to run A/C outside of class time. The cost of this system is yet to be determined
TECHNOLOGY			
Hardware			
Software			

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

Action Plan	Anticipated Outcome	Actual Outcome
Offer CompTIA Security and Network Classes	**Courses offered**	**Courses not offered due to staffing shortages / low enrollment**
Grow on-line engineering courses	**Engineering course offering expanded**	**Engineering course offerings did not expand. With the exception of EE 160 and ICS 111, no additional engineering courses are being offered.**
Maintain Program Assets	**All program assets maintained and labs are organized / clean**	**Most large machines in prototyping lab are currently not operable and need troubleshooting. This is most likely due to neglect from not having a full-time coordinator or lab**

		technician to keep up on maintenance. Consumables have been depleted. Labs are messy and disorganized. Several pieces of equipment have failed.

Part IX. Analysis of Program

Though the program's enrollment has risen and fallen in the 5-year period, the program is working to increase enrollment and has set out to achieve the following goals within the next 5 years to help achieve this objective:

- Hire a full-time program coordinator within 1 year
- Upgrade DKI TECH to include an independent AC system
- Start a social club to provide a social outlet for ETRO students
- Reform advisory board and strengthen our relationships with the community
- Start a laptop rental program for students
- Offer Early College classes
- Provide projects for students
- Work with employers to establish pathways to internships
- Expand network and IT security courses
- Get at least 50% of courses to be **TXT0** compliant by developing in-house teaching material
- Asses feasibility of charging students lab fees to offset the cost of consumables
- Start and inventory system for lab equipment
- Clean and organize labs

Part X. Resource Request(s) for next year (Year 1 of the 5-year Plan for your unit or program).

The program requests the following resources:

- 2 FTE electronics instructors, tenure-track.
- 1 Full-time lab technician (technician can support all trades. Est ~$65,000 / yr)
- 1 Student Worker – Lab Assistant (est. $8000 / semester)
- $3000 / Semester for lab supplies replenishment
- Independent A/C System for DKI TECH building (cost not yet determined)