

Electronic and Computer Engineering Technology (ECET)



2020

ANNUAL REVIEW OF PROGRAM DATA



UNIVERSITY of HAWAII®
MAUI COLLEGE

1. Program or Unit Description

Program Mission:

The mission of the ECET program is to provide students with relevant and rigorous training and education needed for entry-level engineering technology positions in Maui County, and to give graduates mobility within the field and the ability to adapt as the field changes.

The ECET program works closely with its high-technology industry advisory board to ensure students gain skills required for employment with local companies. In this respect, the program builds upon skills, duties and tasks considered critical by these prospective employers

Target student or service population:

The program targets high school students interested in electronics, programming, technology, and their applications; and returning adults.

2. Analysis of the Program/Unit

The ECET program not only provides the technicians needed for the functioning of the community but also feeds UHMC's ENGT program. The overall indicator is Cautionary

Demand Health

The demand health, which states that the program is cautionary, is based on the number of new and replacement positions in the county prorated (#2), and the number of AS ECET graduates (#20a). We believe that the demand health does not reflect the reality.

#	Demand Indicators	2017 - 18	2018 - 19	2019 - 20	Demand Health
1.	New & Replacement Positions (State)	80	72	72	Unhealthy Insufficient Data County Level
2.*	New & Replacement Positions (County Prorated)	1	1	1	
3.	Number of Majors	67	43	39	
3a.	Number of Majors Native Hawaiian	18	9	8	
3b.	Fall Full-Time	46%	43%	46%	
3c.	Fall Part-Time	54%	57%	54%	
3d.	Fall Part-Time who are Full-Time in System	0%	2%	2%	
3e.	Spring Full-Time	43%	44%	43%	
3f.	Spring Part-Time	57%	56%	57%	
3g.	Spring Part-Time who are Full-Time in System	0%	3%	0%	
4.	SSH Program Majors in Program Classes	612	431	374	
5.	SSH Non-Majors in Program Classes	1,880	1,869	1,545	
6.	SSH in All Program Classes	2,492	2,300	1,919	
7.	FTE Enrollment in Program Classes	83	77	64	
8.	Total Number of Classes Taught	44	47	40	

The CIP code chosen for the ECET program (15.202) restricts positions to electrical and electronics engineering technicians. However, ECET graduates are also hired for positions related to information technology and telescope operations which refer to a different CIP code. If we were to include all possible positions, the ratio of new and replacement positions in the county prorated to the number of AS ECET graduates would be higher.

Efficiency Health

The efficiency health, which states that the program is cautionary, is based on the fill class rate (#10), and the majors to FTE BOR Appointed Faculty (#12). We believe that the student/faculty ratio (#12), i.e., the ratio of the number of majors (#3) to the FTE BOR appointed faculty (#11) does not reflect the reality.

#	Efficiency Indicators	2017 - 18	2018 - 19	2019 - 20	Efficiency Health
9.	Average Class Size	18	16	15	Cautionary
10.*	Fill Rate	76%	68.2%	67.5%	
11.	FTE BOR Appointed Faculty	1	1	1	
12.*	Majors to FTE BOR Appointed Faculty	67	43	39	
13.	Majors to Analytic FTE Faculty	67	43	39	
13a.	Analytic FTE Faculty	5	5	5	
14.	Overall Program Expenditures	\$240,563	\$114,890	\$111,289	
14a.	General Funded Budget Allocation	\$123,063	\$114,890	\$111,289	
14b.	Special/Federal Budget Allocation	0	0	0	
14c.	Tuition and Fees	\$117,500	0	0	
15.	Cost per SSH				
16.	Number of Low-Enrolled (<10) Classes	9	13	9	

Number of ECET majors:

There were 28 “active” ECET majors enrolled in courses as part of the ECET program in fall 2019. An active ECET major is a student who is/was enrolled in ETRO 105, the entry-level ECET course, and who follows the ECET program map. Table 1 below shows the number of active students enrolled in the ECET program in fall 2019 and spring 2020 (The number in parenthesis represents the cohort, i.e., the year students enroll in ETRO 105).

Table 1. ECET active students

<i>Fall 2019</i>		<i>Spring 2020</i>	
year 1 (2019)	16	year 1 (2019)	12
year 2 (2018)	5	year 2 (2018)	5
year 3 (2017)	5	year 3 (2017)	5
year 4 (2016)	1	year 4 (2016)	1
year 6 (2014)	1	year 6 (2014)	1
Total ECET	28		24

According to the data provided by the UH system, 39 students (#3) are listed as ECET majors. This number represents the number of active ECET majors (as defined above) plus the number of students who declare ECET as their major but do not have the prerequisite (i.e., MATH 103, in order to enroll in ETRO 105), or who enroll by mistake. We do not know if the remaining 11 students (39 minus 28) will make it to the ECET program in the coming years.

ECET Faculty:

Three ETRO faculty teach ETRO courses. One faculty teaches exclusively lower-division courses, whereas two faculty teach both lower- and upper-division courses (approximately .34 FTE each for lower-division). The number of FTE BOR appointed faculty (#11) is misleading, showing only one faculty, when there should be 1.68 FTE. Therefore, the student/faculty ration does not reflect the reality.

Effectiveness Health

The effectiveness health, which states that the program is cautionary, is based on persistence fall to spring (#19) and unduplicated degrees/certificates awarded (#20). We believe that the persistence fall to spring does not reflect the reality.

#	Effectiveness Indicators	2017 - 18	2018 - 19	2019 - 20	Effectiveness Health
17.	Successful Completion (Equivalent C or Higher)	73%	77%	68%	Cautionary
18.	Withdrawals (Grade = W)	64	44	86	
19.*	Persistence Fall to Spring	71%	64%	66%	
19a.	Persistence Fall to Fall	45%	34%	34%	
20.*	Unduplicated Degrees/Certificates Awarded	23	23	12	
20a.	Degrees Awarded	8	6	6	
20b.	Certificates of Achievement Awarded	9	9	4	
20c.	Advanced Professional Certificates Awarded	0	0	0	
20d.	Other Certificates Awarded	13	13	5	
21.	External Licensing Exams Passed ¹				
22.	Transfers to UH 4-yr	2	2	1	
22a.	Transfers with credential from program	0	1	0	
22b.	Transfers without credential from program	2	1	1	

Based on the data in Table 1, that records the number of active ECET students, the retention rate fall to spring is 75% (not 66%).

Perkins Indicators

#	Perkins Indicators	Goal	Actual	Met	
29.	1P1 Technical Skills Attainment	94.75	81.82	Not Met	
30.	2P1 Completion	61	27.27	Not Met	
31.	3P1 Student Retention or Transfer	86	100	Met	
32.	4P1 Student Placement	66.75	81.25	Met	
33.	5P1 Nontraditional Participation	23.75	25	Met	
34.	5P2 Nontraditional Completion	23.25	0	Not Met	

1P1: Technical Skill Attainment.

It is unclear which technical skill assessments that are aligned with industry-recognized standards, if available and appropriate, have been used to calculate this indicator.

2P1: Credential, Certificate, or Diploma

It is unclear how this indicator was calculated.

5P2: Nontraditional Completion

3. Program Student Learning Outcomes or Unit/Service Outcomes

a) List of the Program Student Learning Outcomes or Unit/Service Outcomes

PLO1: analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems;

PLO2: apply project management techniques to electrical/electronic(s) and computer systems;

PLO3: utilize appropriate mathematics at the level of algebra and trigonometry to solve technical problems;

PLO4: demonstrate critical engineering technology skills and experiences such as: making existing technology operate, creating/selecting new technology, troubleshooting, calibrating, characterizing, and optimizing;

PLO5: demonstrate engineer's way of thinking, analyzing technology as systems;

PLO6: demonstrate engineer professional skills such as communication and managing projects;

PLO7: demonstrate proficiency in the general education college core requirements: creativity, critical thinking, oral and written communication, information retrieval, quantitative reasoning;

PLO8: demonstrate a respect for diversity and a knowledge of contemporary professional, societal and global issues; and

PLO9: commit to quality, timeliness, and continuous improvement.

b) Program Outcomes that have been assessed in the year of this Annual Review.

PLO9: commit to quality, timeliness, and continuous improvement.

Course: ETRO 161, Introduction to Optics and Photonics

c) Assessment Results.

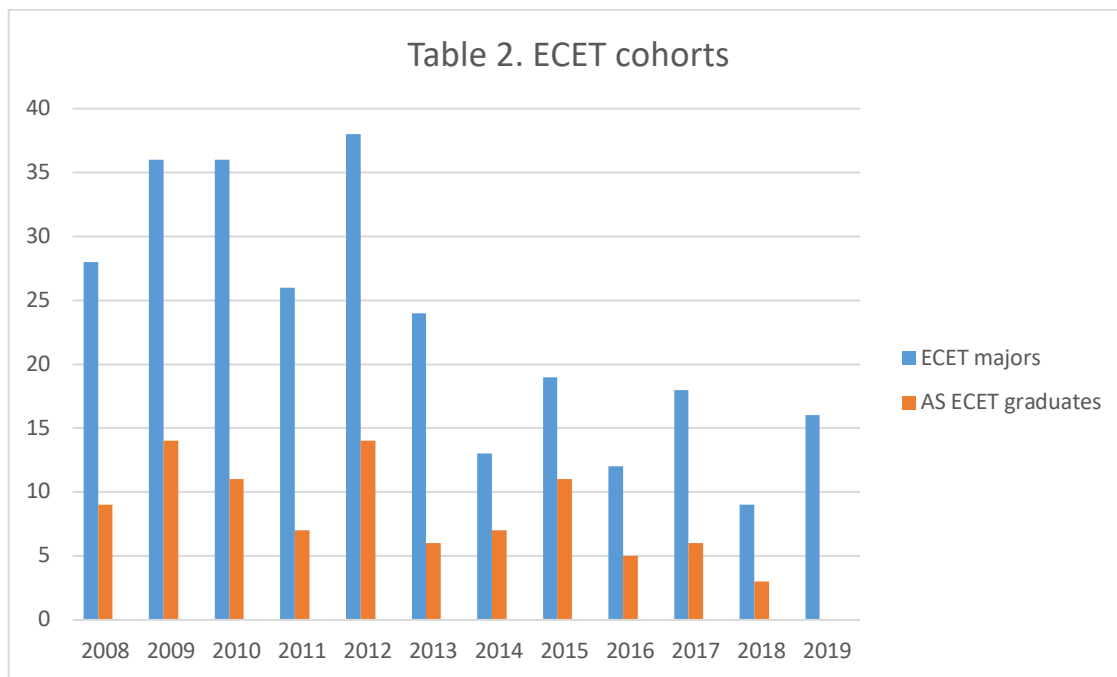
In Spring 2019, as courses switched from face-to face to online synchronous, we decided to assess how the students responded to distance education and their continuous commitment to be successful in terms of attendance, participation, homework, oral presentation, and tests. We did not see any significant difference between the face-to face class and the distance class: attendance remained almost the same (dropped from 90% to 85%); participation was active with students interacting with each other during in-class problem solving and virtual lab; homework was due in time: all students prepared an individual PPT presentation at the end of the year; and all students submitted their final exam.

d) Changes that have been made as a result of the assessment results.

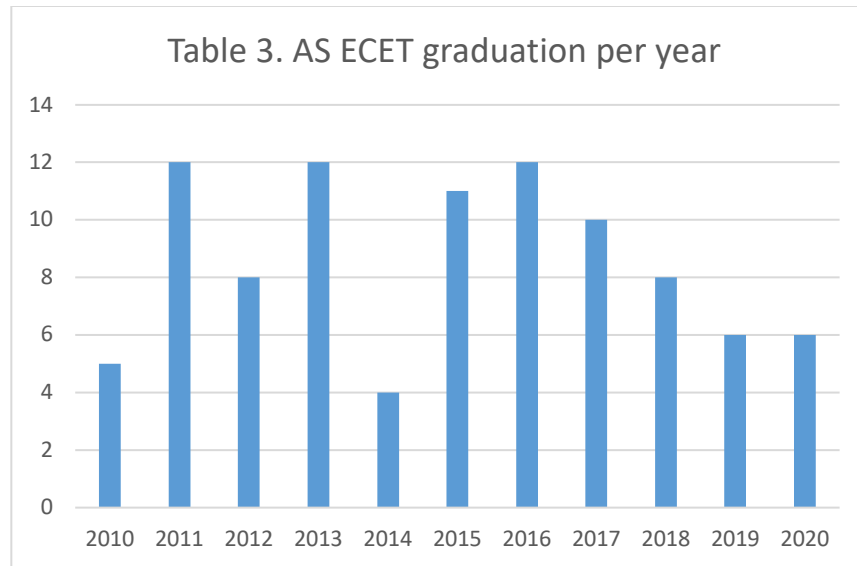
From the instructor perspective: more regular use of Lualima. All lessons plans are posted for each day the class meets.

4. Action Plan

As Table 2 below shows, enrollment in the ECET program has declined since 2013.



With less students in the program, the graduation rate has also decreased as shown in table 3 below: with an annual average of 8.5 graduates, the program is just sustainable.



Based on findings in parts 1-3, the ECET program is strong when it comes to persistence rate Fall to Spring (80% average), persistence rate Fall to Fall (62% average), and graduation rate (50% average, with

80% of ECET majors graduating in 2 years from the time they enroll in ETRO 105, first ETRO course).

The decline in the number of ECET majors on the other hand, and subsequent low-enrolled classes, makes for its weakness.

Therefore, we believe that we need to focus on:

- Enrollment
- Retention and graduation
- Scholarships
- Collaboration with HawCC and KauaiCC for low-enrolled classes

1. Enrollment

UHMC has partnered with Hawai'i P-20 Partnerships for Education: a recorded video of the ECET and ENGT programs was aired during the UH Virtual College Program Fair in August 2020. This video should be sent to high schools to promote the ECET program.

2. Retention and graduation

We believe that extra-curricular activities can motivate the students into completing the program.

- In Spring 2020, we offered ECET majors the opportunity to participate and compete in the Autonomous Vehicle Technology (AVT) project as part of their ETRO 293v required class. The project was such a success that UH Manoa has now joined the team of Maui ECET students

(<https://www.hawaiiavtech.com/about-us> and <https://mauiNOW.com/2020/09/23/uh-maui-students-successfully-compete-in-hack-a-thon-autonomous-vehicle-tech-race/>).

This project will be offered in Spring 2021 to a new cohort of ECET students.

- Each year, some ECET majors join the team of ENGT majors and have a chance to participate in their capstone project. This year 2020-2021, 2 ECET students are participating in “The 2021 Moon to Mars Ice & Prospecting Challenge”.

3. Scholarships opportunities for ECET students

Scholarships are known to be an incentive for retention and graduation. A National Science Foundation S-STEM scholarship up to \$8,000 a year per student is available for talented, low-income with demonstrated financial need ECET, ENGT, and NSCI majors. Currently one ECET student and one ENGT student are benefitting from this scholarship.

UHMC is also in the third phase of a \$2.6 million scholarship grant that, if approved, will benefit students on an engineering pathway: Maui’s ECET, ENGT, and NSCI majors with a concentration in engineering as well as Hawai’i’s ET, ENGT and NSCI majors.

4. Collaboration with HawCC and KauaiCC for low-enrolled classes

Classes that are amenable to on-line delivery should be consolidated. The faculty should be assigned on a rotation basis to provide equitable opportunities for faculty to maintain proficiency. Other classes and labs should remain at individual campuses if there is community need.

5. Resource Implications

- **Lecturers**

The program is currently relying on one lecturer per semester. We anticipate that in the event some ETRO courses are shared with another campus (HawCC and/or KauaiCC), we can limit the need for lecturers.

- **Materials and software licenses:** The program rely on the UH Foundation ECET account to purchase materials and renew software licenses. We anticipate that the donor will continue to contribute year after year.

☐ **I am NOT requesting additional resources for my program/unit.**