March 12, 2021

To: Erika Lacro  
Vice President for the University of Hawai‘i Community Colleges

From: ET/ECET/ENGT Cross-Campus Discussion Group  
Elisabeth Dubuit, UHMauC  
Harold Fujii, HawCC  
Bernard Michels, HawCC  
Jung Park, UHMauC  
Georjeanne Purvinis, KauCC  
Dave Krupp, WinCC (facilitator)  
Laura Nagle, UHMauC (facilitator)

Subject: Cross-Campus Status on UHCC ET/ECET/ENGT Programs

Faculty stakeholders for the Electronics Technology (ET), Engineering Technology (ENGT), and Electronic & Computer Engineering Technology (ECET) programs across HawCC, KauCC and UHMauC met on March 10 to discuss possible options for cross-campus collaborations and increasing instructional efficiency. These faculty stakeholders included Bernard Michels (HawCC), Harold Fujii (HawCC), Georjeanne Purvinis (KauCC), Elisabeth Dubuit (UHMauC), and Jung Park (UHMauC). This discussion reflected upon the previous discussions and recommendations made in the November 9 memo to UHCC VP Erika Lacro (attached).

The group re-emphasized a number of points made in the November 9 memo:

- These programs serve industries on their respective islands. Industry support letters were provided with the November 9 memo.
- Students participating in these programs are often hired into high-paying jobs on their respective islands, sometimes before the students even complete the programs.
- There is an expectation of industry growth which will increase the demand for students with the skills provided by these programs.
- The classes sometimes suffer by having the reputation of being very difficult classes.
- Classes with laboratory components are best delivered in a face-to-face setting.
- HawCC and UHMauC have an existing MOA that provides easy transfer from HawCC into UHMauC's ENGT baccalaureate (BAS) program. Upper division coursework at UHMauC will be entirely online and HawCC students will be able to complete the degree remotely from Hawai‘i Island.
- While not having a formal MOA, KauCC collaborates with UHMauC to facilitate transfer of its students into UHMauC's baccalaureate ENGT program.
- UHMauC received a grant that provides scholarships for ECET, ENGT, and NSCI students that should attract and retain students in the ECET and ENGT programs.
Conclusions regarding some of the recommendations made in the November 9 memo:

- These programs are unique in that they occur on separate islands. This situation is unlike that for O‘ahu campuses where it may be possible for students to travel to different campuses to take classes with face-to-face delivery.
- Lab or lect-lab classes have hands-on components that must be completed in face-to-face settings.
- It would be pedagogically unsound to separate lecture components from lab components into separate classes for existing lect-lab classes.
- There would not be opportunities for class sharing of these lab or lect-lab classes requiring face-to-face interaction among campuses.
- Certain lecture-only classes could be shared across campuses as online classes (e.g., EE 160, ICS 111, and Gen Ed classes).
- Not likely much opportunity to share instructors across these campuses which occur on different islands.

Recommendations to move forward:

- This group will continue to work together in curriculum alignment and class scheduling of those classes that can be shared among the campuses through online delivery (e.g., EE 160, ICS 111, and Gen Ed classes). As the baccalaureate-granting institution, UHMauC will coordinate these collaborations.
- Strengthen the transfer pathways from HawCC and KauCC into the UHMauC BAS in ENGT through the following mechanisms:
  - Establish an MOA between KauCC and UHMauCC similar to that with HawCC.
  - Grant-funded scholarships will be made available to all students in these transfer pathways.
  - Improve marketing to facilitate student awareness of these pathways.
- Reach out to UH Mānoa engineering students who are not succeeding there to consider participation in UHMauC’s BAS in ENGT.

attachment: November 9 memo to UHCC VP Erika Lacro
November 9, 2020

To: Erika Lacro  
Vice President for the University of Hawai‘i Community Colleges

From: ET/ECET/ENGT Cross-Campus Discussion Group  
   Elisabeth Dubuit, UHMauC  
   Harold Fujii, HawCC  
   Bernard Michels, HawCC  
   Jung Park, UHMauC  
   Georgeanne Purvinis, KauCC  
   Dave Krupp, WinCC (facilitator)  
   Laura Nagle, UHMauC (facilitator)

Subject: Cross-Campus Recommendation on UHCC ET/ECET/ENGT Programs

Description of Cross-Campus Group’s Process.

Three UHCC campuses, HawCC, KauCC and UHMauC, were identified as offering relevant classes, certificates and degrees in the following areas: Electronics Technology (ET), Engineering Technology (ENGT), and Electronic & Computer Engineering Technology (ECET). Faculty stakeholders from these campuses were asked to provide feedback: Bernard Michels (HawCC), Harold Fujii (HawCC), Georgeanne Purvinis (KauCC), Elisabeth Dubuit (UHMauC), and Jung Park (UHMauC). A discussion template with links to background information and relevant data was provided to guide the first discussion which took place on Friday October 30. Both Laura Nagle (UHMauC) and Dave Krupp (WinCC) facilitated this discussion. The faculty contributions to the discussion were recorded in the Agenda and Minutes for the meeting. The stakeholders were also invited to continue editing the document after the discussion. Based upon this input, Laura and Dave worked together to draft a memo which was shared with the group for review, discussion and revision on Friday October 6. This memo is the result of this process.

Program Descriptions

UHMauC offers three pathway options for its students: a CA in ECET, an AS in ECET, and a BAS in ENGT. Of these, the AS and BAS have been identified as "small programs" based upon the latest three-year graduation average. Recently, UHMauC has moved to offering its ENGT as alternating cohorts. A new cohort is initiated every other year instead of every year. In addition, some students achieving degrees/certificates in ET at HawCC and KauCC complete the BAS at UHMauC. UHMauC is in the third phase of a $2.6 million scholarship grant that benefits UHMauC and HawCC students on an engineering pathway (ET, ECET, ENGT, and NSCI/engineering ). UHMauC has recently been awarded $1 million grant ($600,000 in scholarships) for ECET, ENGT, and NSCI students that should attract and retain students in the ECET and ENGT programs.
HawCC offers an AAS and a CA in ET that articulates with the UHMauC BAS in ENGT, allowing HawCC students to ultimately complete the UHMauC BAS online. However, both the CA and AAS have also been identified as "small programs" based upon the latest three-year graduation average.

KauCC offers an AS and a CA in ET. These have also been identified as "small programs" based upon the latest three-year graduation average. KauCC's programs also informally articulate with the UHMauC BAS in ENGT. Because of the loss of one instructor, half of KauCC's ETRO classes have been offered at other campuses. The heavy lab classes are being taught locally.

While all three campuses have programs characterized by relatively low enrollments and graduations, they also state that employment demands by local industry exceed what their programs can provide; and the jobs available are actually high-paying jobs. For example, at UHMauC, 90% of BAS ENGT students find a high paying job after graduation (87% of these on Maui). While most of the demand seems to be for students with bachelor's degrees, students with an associate’s degree may get hired as well. They also argue that students are frequently pulled out of school for employment before these students complete their degree/certificate requirements. But both the KauCC and HawCC programs can feed into UHMauC's BAS. There is also an expectation of industry growth and increased job opportunities with the expansion of 5G. The employment opportunities are more numerous and diverse than what may be indicated by the ARPD website based upon the the CIP assigned. More details on employment opportunities are presented below.

It should also be pointed out that all of these programs share some ETRO classes in their curricula. Unfortunately, many of these classes are low-enrolled (enrollment < 10; link requires UH login).

One common challenge for all three campuses is that many of their ETRO classes at the 100 and 200 level are lab/lect-lab classes in which hands-training for some skills is required. Consequently, 100% online delivery is problematic.

**Employment History and Outlook**

90% (87% on Maui) of UHMauC ENGT BAS students (from 2012 to 2020) have found high-paying jobs after graduation. As indicated below (Table I), companies have been consistently hiring BAS ENGT graduates since 2012 (the year corresponds to the graduation year).
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We feel confident that the local companies will continue hiring ENGT majors from Maui and, as soon as the DE BAS ENGT is launched, ENGT graduates from Hawai‘i and Kaua‘i. For instance, the Pacific Missile Range on Kaua‘i has shown interest in, and has a need for, graduates with a bachelor’s degree.

Employers that have hired HawCC students include the following: FAA, HELCO, HawaiianTel, Subaru Observatory, Gemini observatory, SciTel, Pacific Wireless Communications, Hawai‘i Police Department, Department of Water Supply, State of Hawai‘i, County of Hawai‘i, locally and many are working on the mainland U.S.

100% of AS students on Kaua‘i found high paying jobs after graduation or transferred to a 4-yr degree program (with one exception due to medical reasons). In 2020 alone, Kaua‘i has received more than 20 electronic technician or engineering job (70% technicians) opportunity notifications from mostly Navy subcontractors but also solar installers, Hawai‘i Telecom, Spectrum, Pacific Communications, ASCM (Advanced Silicon Carbide Materials) and Xerox.

The CIP code for ENGT (15.999) does not reflect the variety of jobs that ENGT graduates can apply for, nor does the CIP code reflect these additional jobs that require a bachelor’s degree. Student graduates have been hired as electro-optical technologists, electronics design engineers, software developers, junior engineers,
system administrators, and project engineers. The majority of high tech companies on Maui require graduates with a baccalaureate degree at a minimum. On Kaua‘i, student graduates are mainly hired as electronic technicians at PMRF, but recent graduates have also found employment with PacCom and Xerox. UH Annual Report of Program Data (ARPD) support the claim that there is a state-wide demand for BAS ENGT graduates (Table II). But the county prorated data do not reflect the actual situation. It is clear that there are more jobs offerings on Maui than indicated in the ARPD.

Table II
Demand Indicators from UHMauC BAS ENGT ARPD 2020

<table>
<thead>
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<th>Demand Indicators</th>
<th>2017 - 18</th>
<th>2018 - 19</th>
<th>2019 - 20</th>
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<tbody>
<tr>
<td>New &amp; Replacement Positions (State)</td>
<td>72</td>
<td>61</td>
<td>62</td>
</tr>
<tr>
<td>New &amp; Replacement Positions (County Prorated)</td>
<td>2</td>
<td>2</td>
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The launch of the ENGT program was triggered after a 2008-2009 survey sent to the Maui community and local industries indicated that these high technology companies and organizations have frequently been frustrated when hiring employees from the mainland who often move away in less than two years. This situation created a revolving door, which is costly and detrimental to the viability of local companies and organizations. The ENGT program addressed this concern by growing a locally-trained and highly skilled workforce. Although there is no survey for Hawai‘i and Kaua‘i, local companies have expressed an interest in and a need for, graduates with a baccalaureate degree.

Accompanying this memo are numerous support letters and emails from industry and community supporters.

General Recommendations that Emerged from the Discussion.

- None of the campuses supported the idea of eliminating their respective programs, the main rationale being that they are addressing the engineering technology workforce needs of their respective islands. Additional rationales are that their students get employed in high-paying jobs that are likely to increase and diversify in the near future.

- To the extent possible, campuses could share some ETRO courses across campuses through online delivery. This recommendation would be most easily achieved for lecture-only classes, although emerging distance-delivery technologies may permit some classes with lab components to be delivered online.
• For those lab or lect-lab classes that include hands-on components that must be completed in face-to-face settings, campuses could split these classes into separate lecture and lab classes. The lecture classes would then be offered online by one campus (possibly rotated among the campuses), while the lab classes offered by each campus.

• Following the new WinCC Veterinary Technology hybrid model for neighbor island delivery, in which online delivery is provided, but the students also travel to O‘ahu to complete hands-on lab components in intense short-term (e.g., three days) sessions offered on the WinCC campus.

• Develop more effective marketing strategies to attract more high school students to their campuses.

• Secure extramural funding to secure additional support for these programs.

• Restructure cost of the education to the students (i.e., consider lab fees and investigate how tuition is charged for lab classes versus lecture classes.)

Recommendations and Action Items that Emerged from the Discussion Specific to the Maui ENGT BAS Degree Program

• Provide an alternative pathway for four year students in other engineering fields (e.g., electrical, civil, mechanics, and computer) who do not complete mainland or other UH programs. For example, another UH BS Engineering program has a 40% attrition rate. UHMauC’s ENGT BAS program could provide a 1-2 week summer bridge program to catch up on labs in electronics that could be missing and provide a pathway to completion.

• HawCC and UHMC signed an MOA in Spring 2019 that will allow HawC AAS ET graduates to enroll in the ENGT program DE modality starting in Fall 2021. A survey done in October 2020 showed that 12 students could enroll in the ENGT program as juniors from UHMauC (8), HawCC (2) and KauCC (2) AS and AAS students (Table III; next page).

• Partner: One course GEOG 480 at UH Hilo will replace ETRO 455, Remote Sensing starting in Spring 2021. The online synchronous course is scheduled to avoid scheduling conflicts.

• Distance expansion: ENGT courses will be offered online synchronously to off-island students, on the same day and time the in-person course is offered on Maui.
### Table III
Enrollment Projections with Every Other Year Acceptance for the UHMauC BAS ENGT

<table>
<thead>
<tr>
<th></th>
<th>Number of New Students</th>
<th>Number of Students at Start of Year in ENGT Program</th>
<th>Number of Students by End of Year (includes 20% attrition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2021</td>
<td>12</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Fall 2022</td>
<td>0</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Fall 2023</td>
<td>12</td>
<td>16*</td>
<td>13</td>
</tr>
</tbody>
</table>

*This estimate is based on an average of 42% of ENGT majors graduating with the BAS in two years.

- **Strategies for lowering lecturer costs**: the program has already identified full-time faculty on campus that are able to contribute TEs to the program. Therefore, the Maui College ENGT BAS program has no need for lecturers starting Fall 2020.

- Increased recruitment for ENGT BAS students through active statewide marketing of scholarship opportunities to high schools and current students.

- UHMC has been awarded a $1 million scholarship grant ($600,000 in scholarships) for ECET, ENGT, and NSCI majors on Maui. These scholarships should attract and retain students in the ECET and ENGT programs. The scholarship follows the awardees up to 4 years.

- Increased recruitment for ENGT students: active statewide and out-of-state (with the expansion of the DE BAS ENGT) marketing of 2-4 year scholarship opportunities: UHMauC is in the third phase of a $2.6 million scholarship grant that will benefit UHMauC and HawCC majors on an engineering pathway (ET, ECET, ENGT, and NSCI/engineering), as well as support the ENGT DE program.