

7/31/2024

ACADEMIC PROGRAM REVIEW REPORT AY2023-24

Program(s) in the review: BS Electrical Engineering

Specialized Accrediting Agency (if applicable): Engineering Accreditation Commission of ABET

Campuses where the program is delivered: Anchorage KOD KPC MSC PWSC

Year of last review: AY20

Final decision from last review: Continuation

PROGRAM SECTION (Due on March 1)

The program review committee chair and committee members are assigned by the dean. All program faculty should be included in the review process, including faculty on the community campuses. After completing the Program Section below, the program review committee chair will enter their name and date, and email this form to the dean, copying all committee members. If the program is fully delivered on a community campus, copy the appropriate community campus director(s). The program review committee chair's name and date lines are at the end of the Program Section.

Program Review Committee:

Jens Munk, Professor, Department Chair, Program Committee Review Chair, Electrical Engineering

Todd Petersen, Professor, Electrical Engineering

Matt Kupilik, Associate Professor, Electrical Engineering

Mohammad Heidari, Assistant Professor, Electrical Engineering

1. Demonstrate that the program has responded to previous recommendations.

Recommendation 1: Establish a course rotation that reduces internal competition for course enrollment by offering fewer courses per semester and that reduces the number of elective courses offered each semester.

How do you know the recommendation has been successfully achieved? (2500 characters or less)

After the 2020 program review, a few classes that had been offered every semester, such as EE A353, Circuit Theory, were reduced to once a year (Spring semester only) as demand had dipped and the number of EE full time faculty was reduced due to the retirement of one faculty member. As enrollment increased, and the faculty was bolstered by a Term hire in Fall 2023, EE A353 was again offered in the Fall.

Only 3 electives are offered per semester in Fall and Spring respectively, with a mix of power related, or communication related courses. This enables a student who is focusing on one aspect of the degree to take 2 electives per semester in their final year. Reducing elective

offerings below this level would create a hurdle to graduation, or drive our students to take electives from other universities.

With regards to electives, we are currently alternating years for some less popular courses. For example, EE A447 Power Electronics is being offered every other Spring semester, alternating with EE A417 Green Energy. In the Fall, EE A407 Power Distribution is alternating years with EE A4XX Electrical Machines. This was done to add breadth to the power side of the curriculum, and keep the number of elective offerings per semester to an acceptable minimum.

It is expected that the new Term hire, who has a specialty in Data Communications and Information Theory may offer electives in this area to improve the Communication side of the degree. Any new elective will be scheduled in a way as to maintain higher enrollments across elective offerings per semester.

The Mechanical Engineering department approved a curriculum change by which the ME majors no longer take ES A306 Elements of Electrical Engineering, and now take EE A203, Fundamentals of Electrical Engineering, along with the EE and CSE majors. The lab was removed to its own 1CR separate lab class which they do not take. Both lectures covered the same material. Previous to the change, the EE department offered a Fall section of 203 and both Fall and Spring sections of ES A306. We now offer EE A203 every semester, and no longer offer ES A306. The lab, EE A203L, is only offered in the Fall. This reduces the number of courses EE faculty are required to cover per semester, and increases the enrollment in one EE A203 each semester.

Actions taken to date (2500 characters or less)

See above

Evidence of success to date (2500 characters or less)

See above

Recommendation 2: Continue to seek items for continuous improvement, collaborate with UAF to best utilize our respective expertise, and operate in a cost-effective manner.

How do you know the recommendation has been successfully achieved? (2500 characters or less)

Students from UAA have been able to enroll in courses at UAF via distance delivery, and seamlessly transfer those credits over (sometimes with, sometimes without an Academic Petition being required). Likewise, UAF students have been able to enroll in UAA courses that are offered via distance methods.

Actions taken to date (2500 characters or less)

Students can take any EE course from UAF offered remotely, and can transfer that credit for the equivalent UAA course without problem. Likewise, for any UAA EE course that is offered with an online option, UAF students can enroll and have credit applied to their BSEE program at UAF.

Evidence of success to date (2500 characters or less)

Several students in past semesters have taken UAF's autonomous aerial vehicles course which is a 600 level graduate/undergraduate course, which we accept as satisfying one of our Advanced Engineering Elective requirements.

- 2. Demonstrate the centrality of the program to the mission, needs, and purposes of the university and the college/community campus. Include how the program is integrating (or planning to integrate) intentionally designed opportunities for students to develop the four core competencies (Effective Communication; Creative and Critical Thinking; Intercultural Fluency; and Personal, Professional, & Community Responsibility). (3000 characters or less)**

The program meets UAA's mission to support workforce development in the high demand job field of electrical engineering. EMSI data indicates that approximately 90% of the program's graduates work in Alaska. The program collaborates with other Engineering departments, Physics, Geological Sciences, and with numerous government entities nationally and in the state. Some courses are cross-listed and shared with other departments (Physics, CS&E, ME, CE).

The electrical engineering program at the University of Alaska Anchorage is committed to the University's mission to discover and disseminate knowledge through teaching, research, engagement, and creative expression. First, we strive to teach our students the fundamental principles of electrical engineering and important issues in engineering so they may pursue advanced degrees or enter the workplace as productive and competent engineering professionals. Second, the program seeks to further the profession of electrical engineering through professional activities and public service within the community, state, nation and society at large. Finally, the program engages in and disseminates research to advance the development of electrical engineering and provide innovative technological solutions to address the needs of modern society.

Faculty from the electrical engineering program teach courses in support of the Engineering Sciences program and the UAA Mechanical Engineering program. These courses include ES A309 (Circuits for non-electrical engineers), and ES A201 (Matlab for engineers). In addition EE faculty teach no fewer than 6 cross-listed courses, which include EE/CSE A241 (Digital logic), EE/ME 308 (Instrumentation), EE/PHYS 314 & 324 (Electromagnetics I and II), EE/ME A471 (Automatic Controls) and EE/ME A472/A672 (Advanced Linear Systems, which is also stacked as a graduate course in ME). CSE majors also take the following EE courses; EE A203, EE A333, and EE A353. A number of other EE courses can be taken by CSE majors as electives.

EE faculty collaborate with other UAA departments' faculty on numerous research projects

- o Collaborations with CE and ME Departments on study of abrasion on bearings in hydrokinetic environments.
- o Biomechanics, corrosion, renewable energy and other topics with ME faculty.
- o Collaboration with Geology on geophysics related projects.
- o Collaboration with Physics on plasma research and curriculum related issues.
- o Collaboration with CS and CSE on numerous projects.

EE faculty at UAA have conducted external research with, but not limited to, the following entities:

- o National Science Foundation – NSF
- o NOAA Sea Grant – with UAA CS
- o Alaska Department of Fish & Game
- o Numerous projects with UAF
- o Alaska Department of Transportation (ADOT)
- o U.S. Department of Defense
- o U.S. Department of Energy
- o U.S. Department of Transportation

The State of Alaska Department of Labor and Workforce Development does designate engineering as a high demand job area (HDJA).

3. Demonstrate program quality and improvement through assessment and other indicators.

a. Program Student Learning Outcomes Assessment and Improvement Process and Actions

i. BS Electrical Engineering

- *1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; 2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; 3) An ability to communicate effectively with a range of audiences; 4) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts; 5) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; 6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; 7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

Describe your key findings for these outcomes. (3500 characters or less)

Student Learning Objectives are assessed every year with a variety of methods. These are assessed as a requirement for degree accreditation by ABET, as well as monitoring the health of the program.

Results from the Fundamentals of Engineering (FE) Exam, which is conducted by NCEES (National Council of Examiners for Engineering and Surveying) twice a year is used to assess outcome 1 and 4. We are provided with results from first time test takers, for both students taking the exam within 12 months of graduation, and for alumni outside 12 months of

graduation. These results are aggregated as an average over all UAA EE test takers versus the national average of all test takers. We also monitor each category of the EE FE exam for student performance as a check on individual subjects.

There is a Graduate Exit survey provided to seniors at the end of their capstone design course, where we survey them on their opinion of how well they did with respect to mastery of the 7 SLOs and how well we as a department did with instruction of those SLOs. Additional items on the health of the instructional labs, computer labs, facilities, etc. are also surveyed.

Additional assessments of SLOs are performed by individual instructors in specific classes. Every Fall semester before classes start we conduct a Faculty meeting where the results from the prior AY's assessments are discussed, and assessments for the new AY are assigned.

Individual instructors will determine the manner in which they choose to evaluate student performance on the objective. Upon completion of the assessment, a document is produced outlining the SLO, how the assessment was conducted, a summary of the results, and then comments or concerns.

All of the assessments are collected and presented in an annual assessment report for the department. They are then saved in the assessment repository for use in the next ABET assessment cycle.

The EE department has established an Advisory Board with members consisting of program graduates, representatives from major employers of electrical engineers in the Anchorage area, and a distinguished faculty member. During annual, or semi-annual meetings, the findings and recommendations in the assessment report are discussed along with any potential changes to the curriculum. The Board members also offer insight into the needs for EEs in the workforce, and how we can best meet that goal.

The most recent PSLO assessment review showed that assessed student performance on all 7 outcomes were ranked satisfactory or above. FE Exam results were above the national average in all categories. Graduate exit survey results were positive (above 3.5/5 on Outcome 1, 3, and 5 and 4.0/5 or above on outcomes 2, 4, 6 and 7). Individual assessments conducted in courses are all 3.0/4 or above. The lowest aggregate Learning Outcome is outcome 5: the ability to function on a team, though it is a 3.22/4 and satisfactory. This is not surprising as we have not had an emphasis group work up until the capstone class. However students are still performing well.

Describe actions taken to improve student learning for these outcomes. (3500 characters or less)

The most recent annual assessment reviews have identified no areas of concern requiring adjustments to curriculum or program actions. The Graduate Exit Survey has highlighted that presentation/oral communication skills are lower than other outcomes. In prior years, the only time students were required to actually do any public speaking was in their Capstone presentation. To provide more practice with this skill, several instructors have implemented design projects into their upper division classes, where a brief oral presentation is a deliverable for the project assignment. This reinforces the need to be able to communicate effectively to a wide audience, and provides opportunities to practice this skill.

Describe evidence that these actions are working. (3500 characters or less)

Student performance on the FE exam has shown a positive trend in recent years.

Several PSLOs are evaluated during student senior design presentations. There has been a noticeable improvement in the quality of student projects, as well as the quality of the student presentations.

- b. Demonstrate program quality and improvement through other means, for example, maintaining specialized accreditation, using guidance from advisory boards/councils, responding to community partners and local needs, maintaining currency of the curriculum, implementing innovative program design, intentionally integrating high-impact teaching and learning practices into the program, and meeting indications of quality in distance education, such as the C-RAC Standards. (3500 characters or less)**

The BSEE program was re-accredited by ABET in 2023. Based on what was learned through the process, we revised our PEOs focus on what our graduates will attain, rather than what the program will produce. Upon completion of this revision, the EE faculty solicited feedback from our advisory board, which includes alumni and employers. Feedback was solicited and received via email. Advisory Board members reacted positively to the new PEOs, and none objected or asked for edits.

The Department of Electrical Engineering is committed to providing curriculum that is both current and relevant to students, and constituents, which include our industry partners, our Advisory Board, and former students.

Recent actions taken include development of a new course in Network Security, which addresses an important need within our local telecommunications community. This is particularly relevant given the recently passed Infrastructure Bill, which has earmarked over \$1 billion for broadband access throughout Alaska, and as a result the demand for telecom engineers is expected to dramatically increase over the next several years. To further address this the Department of Electrical Engineering has recently hired a Faculty member with a telecom background to help train engineers and meet this demand.

In addition, our program has greatly enhanced its offering of upper division electives in the area of power engineering. New courses in the area include Power Transmission, Electrical Machines, Green Energy, Power Electronics and System Reliability. Topics for these courses have been chosen based on the expertise of our faculty, and in consolidation with employers and engineers within the power industry. Alaska offers unique opportunities for collaborative research with other universities in the area of power engineering, which include Virginia Tech., George Washington University, University of Washington and UAF, with others expected to be added over time.

4. Demonstrate student success and the closing of equity gaps.

- a. Analyze and respond to the disaggregated data in the data sheet for your program. Provide clarifications or explanations for any positive or negative trends indicated by the data, and**

discuss what you are doing to close any equity gaps. The Student Success program review metrics are Junior Graduation Rate, Associate Graduation Rate, Semesters to Degree – Graduate Programs, and Course Pass Rates by Course Level. (3500 characters or less)

In 2023 our Junior Graduation Rate was 88.9%, which was largely unchanged over the past several years (no data exists before 2021), which comprises full-time students. By race, these numbers are 100% for Alaska Native/American Indian, Hispanic, and White. One concern is the underrepresentation of African American students within our program, which until recently had not been an issue. We attribute most of this to our declining enrollments over the past several years. Another concern is the decrease in the Junior graduation rates for students between the ages of 18-24. This is likely due to disruptions during the Covid pandemic, however we will pay close attention to this metric moving forward.

Pass rates for lower level undergraduate courses was 91% and 100% for full and part-time students, respectively. Both of these percentages are significantly higher than historical values, which were 78% and 65% when averaged over 2019-2022. Furthermore, these results are consistent over race/ethnicity and the characteristics identified in the data provided. We will continue to monitor these metrics to better determine whether a trend exists, or these data are an anomaly.

For upper-division course pass rates the data are more consistent at 91% and 83% for Full and Part-Time students, respectively, although both are trending slightly positive. One concern is the below average pass-rates among several under-represented groups, including African American (67%), and Native American (47%). These numbers are inconsistent with our historical pass rates, which are more inline with the general average. We attribute this to a small sample size, rather than a deterministic trend. As a department we make every effort to give all of our students a sense of belonging, and will therefore continue to carefully track these statistics moving forward.

- b. Numerous US universities, and a number of programs across UAA, have holistically evaluated their programs and courses to look for unintended barriers to student success. For example, the Purdue IMPACT (Instruction Matters: Purdue Academic Course Transformation) effort between 2011 and 2018 resulted in 325 courses being redesigned to incorporate research-based strategies known to increase student outcomes, while maintaining academic quality and rigor. Other efforts have involved course sequencing and scheduling, resulting in improved success even for [graduate students](#). Please consider your program's graduation rate, course pass rates, and similar data sources to reflect on any barriers to students moving through the curriculum, and describe what steps you have taken (or are planning to take) for possible redesign of gateway courses, course sequence changes, course scheduling, or similar efforts. (3500 characters or less)**

A barrier to graduation with the EE program is that upper division courses are only offered once a year rather than every semester. This is not something that can be changed with the current number of EE faculty, and lower enrollments, and will likely remain static in the foreseeable future. One recent change is to offer Fundamentals of EE (EE A203) and its sequel, Circuit Theory (EE A353) every semester. This is particularly important in regards to EE A353, since it is

a pre-req for no less than four upper division EE courses. Thus students who do not pass this course are not set back a full year from taking any of the follow up courses.

- c. **Provide evidence of the overall success of students in the program. For example, you might talk about the percent of students in post-graduation employment in the field or a related field, the percent of students who go on to graduate school or other post-graduation training, and/or the percent of students who pass licensure examinations. You might also give examples of students who have been selected for major scholarships or other competitive opportunities. [Please do not use personally identifiable information.] (3500 characters or less)**

Graduates from the EE program have been successful in gaining employment from a wide range of employers in Alaska and beyond. We have graduates working locally for federal agencies, local telecommunications and utilities, and Alaska oil and gas corporations, as well as all of the local engineering consulting firms in Anchorage. Outside of Alaska our students are, or have been employed by major national and international employers in oil and gas, engineering, aerospace, and technology industries.

In summary, our former students are employed both within and outside of Alaska, and generally have multiple job offers. We have, to the best of our abilities, tracked our graduates from their first to their current jobs. Feedback from former students is unanimous in their praise for the education they have received at UAA, stating that they felt very prepared. Our aim as educators is to provide our students with the necessary tools to help them obtain their goals.

Our graduates have also applied and been accepted into MS and/or PhD programs across the country. Additionally, several of our former students currently serve as faculty at other universities.

Our students have received numerous Scholarships. Most notably a recent graduate was the recipient of the prestigious Goldwater Scholarship, and is currently pursuing his PhD in plasma physics, having turned down a similar offer at another prestigious institution.

5. Demonstrate demand for the program.

- a. **Analyze and respond to the data in the data sheet for your program. Provide clarifications or explanations for any positive or negative trends indicated by the data, and discuss what you are doing to improve. The Demand program review metrics are Ratio of Out-of-Discipline Credit Hours to Total Credit Hours, Number of Program Graduates Who Continue Education, and Number of Program Graduates Who Return to UAA to Pursue an Additional Program. (3500 characters or less)**

Demand for Electrical Engineers in Alaska currently far exceeds the number of new electrical engineering graduates at UAA and UAF combined. Like many programs we have experienced a decline in our enrollment numbers, which we attribute to several factors. The first being the budget cuts to the University of Alaska system, which had a detrimental impact on outside perceptions of the university system. More recently the Covid outbreak introduced new challenges, particularly in regards to delivering quality instruction using distance delivery. Despite this, a number of current and potential students chose to either take fewer courses per

semester, or postpone their education altogether. Finally, as the high-school enrollments within Anchorage have declined, UAA has also seen a proportional decline in their enrollments.

Our 2023 ratio of out-of-discipline credit hours is 18.75%, which has been nearly constant over the past several years. This percentage is primarily made up of CSE and ME students who are taking required EE electives. These electives include Fundamentals of EE (EE A203), which is required by CSE, as well as Circuit Theory (EE A353(L)) and Electronic devices (EE A333), which are required by CSE. A recent curriculum change has moved ME students from taking ES A308 Elements of Electrical Engineering into EE A203 Fundamentals of Electrical Engineering, which will change the above mentioned ratio in future semesters.

A number of other upper division courses are cross-listed with ME, including Instrumentation and Measurement (EE/ME 308), Advanced Controls (EE/ME A472/A672). As the ME students are enrolling in a ME prefix version of the course, those students are not counted in the above mentioned ratio.

The number of program graduates who continue their education has been experiencing an uptick over the past several years, and currently stands at 7. Given the number of students who have graduated in our program this is an encouraging outcome and we continue to place students in some of the top graduate programs in the country.

The number of program graduates who return to UAA to pursue an additional program has been historically low, however we expect this number to increase significantly in the near future. This will be the result of active research being performed by our faculty, with a proportional demand for new graduate students, particularly in the area of power. Furthermore, a new MS in Data Science and Engineering is currently being reviewed and is expected to be approved sometime this year.

Despite the challenges described earlier, we are beginning to see an uptick in our enrollment numbers, and we expect these numbers to increase over time. Our reputation among students has always been excellent and we feel confident that we will return to, and even exceed our historically high enrollments.

6. Demonstrate program productivity and efficiency.

Analyze and respond to the data in the data sheet for your program. Provide clarifications or explanations for any positive or negative trends indicated by the data, and discuss what you are doing to improve. The Productivity and Efficiency program review metrics are Five Year Degree and/or Certificate Awards Trend, Student Credit Hours per Full-Time Equivalent Faculty, and Full-Time Equivalent Student per Full-Time Equivalent Faculty. (3500 characters or less)

We observe a negative trend in total student credit hours per full time equivalent faculty (SCH/FTEF) and the full time equivalent students per full time equivalent faculty (FTES/FTEF), with both the SCH/FTEF and FTES/FTEF experiencing declines of approximately 36%. For comparison, Electrical Engineering falls between Civil Engineering, which experienced a 55% decline, and Mechanical Engineering, which experienced a 30% decline over the same time period. We have previously speculated on a number of reasons for these declining enrollments, including 1) Cuts to the UA system and the associated negative publicity, 2) The Covid pandemic, and 3) Declining enrollments

in the Anchorage School District. Despite these challenges, we are beginning to see an uptick in student enrollments in our introductory courses, and I believe that we will again see the growth that we experienced early in our program.

I have long been an advocate for more aggressive student recruitment, particularly outside of the state of Alaska. I believe this is important for several reasons, the first being the declining enrollments, mentioned above, and the second is that having a larger percentage of out-of-state students helps UAA move beyond the perception of being a local or community college. Our facilities and faculty are world class.

This follows the university and college trends in declining enrollments, though this comparison is anecdotal and it is difficult to compare the department's overall trends without data for other departments, colleges, and the university as a whole.

Optional: Discuss the extent to which, if any, extramural funding supports students, equipment, and faculty in the program. (3000 characters or less)

- 7. Assess program distinctiveness, as well as any duplication resulting from the existence of a similar program or programs elsewhere in the University of Alaska System. Is duplication justified, and, if so, why? How are you coordinating with UAA's community campuses and the other universities in the system? (2500 characters or less)**

Both UAF and UAA offer a BSEE, while UAF is able to also offer MSEE and a PhD in engineering. The combined graduates from both programs are not satisfying the demand for EE's in Alaska, and there is capacity for growth at both programs.

UAF and UAA serve different populations. UAF is the destination campus with a majority of their students living in on-campus housing, while UAA is the commuter campus serving the local population in Anchorage and nearby locations. UAA offers an affordable path to a degree in Electrical Engineering for students who lack the finances to travel out of state for college or even to Fairbanks where they would be encumbered by housing costs.

Both the UAF and UAA BSEE degrees are ABET accredited, which means the core degrees satisfy the same requirements for an EE degree. A BSEE from an ABET accredited institution is recognized nationwide as a step towards professional certification. Where the two programs differ is in the selection of Advanced Engineering Electives, which is a function of the expertise of the faculty at each institution. We both generally offer courses in the electrical power industry and communications. UAF has offerings in UAVs while UAA has a greater emphasis on electromagnetics.

- 8. Assess the strengths of your program and propose one or two action steps to address areas that need improvement. (4000 characters or less)**

I believe as a program our primary strength is the quality and dedication of our faculty. While each has their own strengths and weaknesses, we strive to work collectively to ensure that every faculty member's potential is maximized. This means some faculty members have a higher teaching load, while others have a significant research component. As a department we greatly value collegiality, and fully support each other. As a department we have a reputation for being excellent instructors,

with many of our current and former students having switched to EE from other disciplines. While all of the EE faculty are active in research, we consider undergraduate education to be the most important component of our workloads.

Another strength are our facilities, particularly our laboratories, which in terms of quality and quantity of equipment is impressive. For example, the Electrical Power and Utility Lab is equipped with 10 desktops, Electrical Machines station, three 1 KVA transformers with multiple taps, four Canadian CS6K260 solar panels (EIB Roof), two Midnite Solar MN150MPPT Classic Charge Controllers, one Magnum MS2812 1000 W pure sine inverter and two Rolls AGMS6275, 6V, 250AH, Absorbent Glass Mat (AGM) batteries. One rack RTDS Power Simulator and Accessories are available in the Lab. It is in one mid-size cubicle including three processor cards (PB5) and 12 channel Analogue I/O cards. One recently installed microgrid testbed (Typhoon HIL emulator hardware unit) is also available in the lab. It includes two HIL604 emulator hardware units, one EPC inverter, one SEL 751 relay, one HIL compatible ComAp Genset (IG2GSC) and microgrid controller plus associated communication hub and Human Machine Interface.

Our general EE lab is equipped with 18 fully functional workstations, with each workstation comprising a computer, an oscilloscope, a signal generator, a frequency counter and multiple power supplies. We are also well equipped with breadboards, resistors, capacitors, inductors, diodes, transistors and other electrical devices.

Likewise, our Electromagnetics Lab is outfitted with 5 state-of-the-art Vector Network Analyzer, 7 Spectrum Analyzers, along with a slew of signal generators, power supplies, multimeters and oscilloscopes.

After completing the Program Section above, the program review committee chair should enter their name, date, and email this form to the dean, copying the committee members. If the program is fully delivered on a community campus, copy the appropriate community campus director(s).

Committee chair first name last name: Jens Munk

Date: 3/1/2024

END OF PROGRAM SECTION

DEAN SECTION (Due on April 1)

If the program is fully delivered on one or more community campus, the dean should consult with the director(s) of the campus. After completing the Dean Section below and entering their name, the dean should email this form to the committee. If the program is delivered on a community campus, copy the appropriate community campus director(s). The program has one week to provide an optional response to the Dean Section using the Program Optional Response Section of this form.

1. Evaluation of Progress on Previous Recommendations

For each recommendation from the last program review, indicate if the recommendation has been met or has not been met and provide commendations and guidance as appropriate. (2500 characters or less for each recommendation)

Recommendation 1: Establish a course rotation that reduces internal competition for course enrollment by offering fewer courses per semester and that reduces the number of elective courses offered each semester. Recommendation has been met.

We concur that the program has realistically tracked its elective offerings to its faculty resources as described during the review period. The new term hire in data communications and information theory was made to meet a local need and is expected to provide expanded offerings. The Department is commended for working with the ME Department to eliminate a service class (ES A306) that was extremely similar to an existing departmental class (EE A203).

Recommendation 2: Continue to seek items for continuous improvement, collaborate with UAF to best utilize our respective expertise, and operate in a cost-effective manner. Recommendation has been met.

The Department has been accepting upper-div UAF courses for advanced elective degree credit. The autonomous aerial vehicle course has indeed been popular with students.

Provide your analysis of #2-8 below, based on the data provided and the program's responses above.

2. Centrality of the Program. (2000 characters or less)

We agree that Department faculty are integral to the largest programs in the College in that they teach courses that serve ME, CS and CSE students (some required, some elective). We also affirm that the Department faculty are involved in research collaboration both inside and outside the College to a great degree. While the Department did not comment directly on UAA's Core Competencies, we are confident in asserting that the BSEE program gives students opportunities to develop these skills similar to the other CoEng baccalaureate programs.

3. Program Quality and Improvement (2000 characters or less)

The BSEE program has an appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained, per criteria required by ABET for its accreditation as described. The program was recently re-accredited by ABET.

4. Student Success and the Closing of Equity Gaps (2000 characters or less)

We concur with the Department's analysis of its junior graduation rates and course pass rates, including the suspicion that fluctuations are partly the result of COVID and the statistics of small numbers. The Department's struggle to offer sufficient upper-div electives to its students is noted, and the Department is commended for accepting upper-div courses from UAF to ease this bottleneck. It is also to be hoped that our recent term hire will expand these offerings. Local demand to graduates of the BSEE program is strong.

5. Demand (2000 characters or less)

We suspect that the Department's reasoning as to factors contributing to its declining enrollments (COVID, budget cuts to the UA system, and declining HS enrollment in Alaska) are likely correct. Enrollment is a major issue throughout the College. We recommend that the Department work with Enrollment Services to identify additional opportunities for outreach and collaboration. We agree that, although the Department is small, its faculty are essential for delivery of many core and

elective courses used by other programs, particularly the BS and MSME, the BA/BS CS, and the BSCSE. We affirm that demand for engineers in Alaska, including electrical engineers, exceeds what UAA and UAF are able to produce.

6. Productivity and Efficiency (2000 characters or less)

We suspect that the Department's reasoning as to factors contributing to its declining SCH/FTEF and FTES/FTF (COVID, budget cuts to the UA system, and declining HS enrollment in Alaska) are likely correct. We further agree with the Department that these trends are College-wide. We recommend that the Department work with Enrollment Services to identify additional opportunities for outreach and collaboration (this recommendation is not limited to the EE Department).

7. Duplication and Distinctiveness (2000 characters or less)

We affirm that the combined production of EE grads from both our College and the UAF College of Engineering and Mines is insufficient for the current needs of the state. Both programs primarily serve students within the catchment area of each university, and each program has its own areas of distinction thanks to specialization among the faculty.

8. Strengths and Ideas for Moving Forward (2000 characters or less)

We concur that the greatest strength of the Department is its faculty, whose teaching and research is thoroughly integrated into the missions of both the College and the University. The Department's greatest challenge and focus during the next review period is enrollment (this is true throughout the College).

Dean's Final Evaluation

I commend the program for: (number and list the specific commendations in the narrative box, 2000-character limit)

The Department is commended for successfully navigating reaccreditation of the BSEE by ABET, and for its robust assessment and continuous improvement process. The Department faculty are commended for their outsized footprint on the teaching and research work of the College. The Department's recent hire of a term faculty member in data communications and information theory is exciting and is expected to generate new opportunities for students and colleagues in the next review period.

I recommend that the program: (number and list the specific recommendations in the narrative box, 2000-character limit)

The Department's greatest challenge and focus during the next review period is enrollment (this is true throughout the College). We recommend that the Department work with Enrollment Services and its Advisory Board to identify new opportunities for outreach and engagement. The department should also consider additional upper-division electives that may be shared with UAF to provide students with greater elective offerings. Finally, the program should continue to develop curricular options in telecommunications that are needed by the workforce to implement the IJA broadband deployment in Alaska.

7/31/2024

Dean's overall recommendation to the provost: Continuation -- Program is successfully serving its students and meeting its mission and goals. No immediate changes necessary, other than regular, ongoing program improvements.

If an Interim Progress Report is proposed, recommended year: N/A

If a Follow-up Program Review is proposed, recommended year: N/A

Proposed next regular Program Review: AY2031

After completing the Dean Section above, the dean should enter their name, date, and email this form to the committee. If the program is fully delivered on a community campus, copy the appropriate community campus director(s). The program has one week to provide an optional response to the Dean Section using the Program Optional Response Section below.

Dean first name last name: Kenrick Mock

Date: 4/1/2024

END OF DEAN SECTION

PROGRAM OPTIONAL RESPONSE SECTION (Due within one week of receiving dean's review)

Programs have the option to submit to the provost a response to the dean's evaluation within one week of receiving the dean's review, using the narrative box below. Please indicate whether or not you will submit an optional response below.

Are you submitting an optional response? If yes, add your response below, enter your name and date, and follow the guidance below for submission. If no, enter your name and date, and follow the guidance below for submission. **No**

Optional Response: (10,000 characters or less)

After completing this section, the form should be submitted to uaa.oaa@alaska.edu, with a copy to the dean. If the program is fully delivered on a community campus, copy the appropriate community campus director(s) as well.

Committee chair first name last name: Jens Munk

Date: 4/10/2024

END OF PROGRAM OPTIONAL RESPONSE SECTION

7/31/2024

PROVOST SECTION (Due on August 1)

After completing, signing, and dating the Provost Section of this form, email the completed form to the program review committee and dean, with a copy to uaa.oaa@alaska.edu for posting. If the program is delivered on a community campus, copy the appropriate community campus director(s) as well.

Provost's commendations, additional or adjusted recommendations, if any, and other general comments (3500 characters or less):

I agree with the dean's commendations and would also like to recognize the faculty's significant effort around the capstone experience, connecting students with real issues faced by Alaskan companies. I also agree with the dean's recommendations, in particular, the need to grow undergraduate enrollment. As part of its recruitment strategy, the program will want to explore alignment and engagement with the Anchorage School District academies.

Finally, I am asking programs to ensure that all students have access to high-quality, highly-engaged learning opportunities, such as internships, practicums, clinicals, study away, and undergraduate research, regardless of modality or location. Programs will be asked to report on progress toward this goal in their next Program Review. These efforts naturally complement and extend our commitment to UAA's core competencies: Effective Communication; Creative and Critical Thinking; Intercultural Fluency; and Personal, Professional, and Community Responsibility. The Electrical Engineering program has already demonstrated this through its capstone experience, and it is well positioned to demonstrate this even more fully in its next scheduled Program Review.

Provost's decision: Continuation -- Program is successfully serving its students and meeting its mission and goals. No immediate changes necessary, other than regular, ongoing program improvements.

Interim Progress Report: N/A

Follow-up Program Review: N/A

Next regular Program Review: AY2031

Provost's signature: Denise K. Runge

Date: 7/31/2024