

ACADEMIC PROGRAM REVIEW FORM

All academic programs and units at UAA are required by Board of Regents Policy P10.06.010 to engage in program review on a seven-year cycle. University Regulation R10.06.010 sets out the minimum requirements for program review, including centrality of program mission, quality, demand, program productivity, effectiveness, and efficiency. Exceptional reviews may be conducted, per University Policy and Regulation, and with the provost's approval. The UAA process integrates information about student learning outcomes assessment and the improvement of student learning, as well as progress on student success measures and the closing of equity gaps, aligning program efforts and resources with institutional priorities. Final decisions include commendations and recommendations, which guide future program efforts. The results of cyclical Academic Program Review are reported to the UA Board of Regents annually and are published on the UAA [Academic Program Review website](#).

This form is composed of four parts: the Program Section, the Dean Section, the Program Optional Response Section, and the Provost Section. Guidance for submission is provided in each section.

Using the Form: The form is pre-loaded with information specific to each program and sent by the dean to the program. The program should download and save their form to begin using it. The form is locked, so instructions are viewable and the only sections of the document that can be edited are the form fields. To ensure the fillable fields function correctly, the form must be completed in Microsoft Word. It will not function properly in Google Docs. Programs that wish to record collaborative discussion of the report might consider creating a separate document to take notes, prior to entering final responses in the official fillable form.

The form uses narrative boxes, text only, and drop-down boxes. Narrative boxes have a character limit, which includes spaces. To undo an answer, press "Control-Z" or "Command-Z."

Responses are to be narrative text only, and must be ADA and FERPA compliant, and must not include the names of any current or former employees. Do not embed any tables or links, including to webpages or other documents. To be FERPA compliant, do not include the names of any current or former students. Rather, use statements such as, "In AY22 four program graduates were accepted to graduate programs in the field." Programs with specialized accreditation or other external recognitions must comply with restrictions regarding what may be published, as per the accreditor or external organization. Do not include appendices. Appendices to this form will not be accepted.

Data: Each program is provided a datasheet, along with this pre-loaded form. For questions about the data, please contact Institutional Research (uaa.oir@alaska.edu).

Assistance: For technical assistance with this form, email Academic Affairs (uaa.oaa@alaska.edu).

Program(s) in the review: BS Computer Systems 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: Continued Review

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:

Frank Witmer, Associate Professor, Anchorage campus

Sebastian Neumayer, Assistant Professor, Anchorage campus

Masoumeh Heidari, Assistant Professor, Anchorage campus

Kamran Siddique, Term Assistant Professor, Anchorage campus

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

Recommendation 1: Conduct an analysis of the high attrition rate and develop a plan to address it.

How do you know the recommendation has been successfully achieved? (2000 characters or less)

To evaluate the attrition rate, we looked at the number of declared CSE majors by academic year (i.e. Fresh/Soph/Junior/Senior) over the last five years. We also evaluated individual courses with low pass rates and modified the curriculum to improve student success.

Actions taken to date (2000 characters or less)

In reviewing course pass rates we determined that the CSCE A201 course was an unnecessarily difficult first course for students to pass and was contributing to a high attrition rate. This course often registered the second highest DFW rate among all UAA courses. To address this barrier, we modified the introductory course sequence.

For AY2020-2021, we revised the BS in CSE by adding the required class, CSCE A101 Introduction to Computer Science, and then offset the additional credits by reducing the number of required upper division credits from 15 to 12. This new course provides a gentler introduction to programming using the Python programming language. The subsequent programming courses, CSCE A201 and CSCE A211, were revised to build on this foundation and introduce more advanced concepts using the C and C++ programming languages.

Evidence of success to date (2000 characters or less)

The revised curriculum is showing initial signs of success with improved pass rates for lower division courses. For the 2018-2020 period, pass rates averaged 60.1%. After adding the new CSCE A101 course, the lower division pass rate increased to an average 65.66% for 2021-2022.

This trend can also be seen in decreasing Drop/Fail/Withdraw (DFW) rates for CSCE A201:

CSCE A201 Drop/Fail/Withdraw Rates

| Term | DFW |
|------|-----|
| SP17 | 48% |
| FA17 | 52% |
| SP18 | 44% |
| FA18 | 47% |
| SP19 | 45% |
| FA19 | 59% |
| SP20 | 51% |
| FA20 | 38% |
| SP21 | 27% |
| FA21 | 27% |
| SP22 | 36% |
| FA22 | 24% |

For the attrition data by year, these curriculum changes also seem to be helping. The percentage of Fresh students that advanced to Sophomore status was 32% from fall 2018 to fall 2019. This number was a similar 30% for the following year. Starting in 2020, the number rose to 41% and for fall 2021 (the most recent data available), the number increased further to 50%. These numbers reflect an encouraging trend of retaining more students through the lower division courses.

Recommendation 2: Monitor the progress of students, identify hurdles/bottlenecks toward degree completion, and take any necessary actions to ensure students will be successful completing the degree.

How do you know the recommendation has been successfully achieved? (2000 characters or less)

Since students have been generally unwilling to respond to department surveys and the EMSI Alumni Outcomes reports are no longer available, we rely on one-on-one correspondence with students to evaluate program changes. Most often, this occurs during mandatory advising

meetings with students when we are able to ask about life and challenges they are facing in completing their degrees. Occasionally these discussions happen during or after scheduled class time.

Students almost always have multiple demands on their time, juggling work and/or family obligations. While we can do little beyond recommending time management strategies for those students with these kinds of hurdles, we were able to identify some changes to reduce barriers toward degree completion.

Actions taken to date (2000 characters or less)

In talking with students, we learned that the WRTG A212 course was sometimes difficult to fit into their schedule and that students were reporting mixed results from this course.

To address this barrier, we modified the writing requirement by giving students more flexibility in the allowable courses. Instead of requiring students to take WRTG A212 Writing and the Professions, they can now choose between any of the General Education Requirement writing courses (WRTG A111, A211, A212, A213, or A214), all of which serve as a second-semester written communications course at UAA.

We have also worked to retain students by reviving clubs that fell dormant during the COVID-19 distance learning period. In particular, the UAA Robotics club and Computer Science club are active again.

Evidence of success to date (2000 characters or less)

We have heard from students that the increased flexibility and choice of writing classes has been beneficial, though all recent graduates and current Capstone students entered the program early enough that they completed the WRTG A212 course. The reduction in number of upper division elective credits from 15 to 12 also resulted in fewer course constraints for upper division students.

Our efforts to revive club membership is evident in increasing student membership and club activities. The Robotics club has been successful at recruiting students (mostly from CSE and EE) and recently competed at a nation-wide tournament. Club membership has quadrupled from fewer than 5 members to over 20 members now. The CS club is active with projects and discussions coordinated via a dedicated Discord server.

The department also held a Duckiebot competition last semester in conjunction with the Alaska Developers Alliance and ArcticShield. Several CSE students contributed to the assembly, programming, and testing of the Duckiebot robot.

- 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). (2500 characters or less)

The BE CSE program contributes directly to UAA's mission of transforming lives through teaching, research, and community engagement in a diverse and inclusive environment. Students that earn our degree are empowered to apply for and attain high paying jobs both within and beyond Alaska. For many of our graduates, they are first-generation college attendees, and completing their degree is truly life-changing for them and their families.

In terms of the four core competencies, Effective Communication is integrated throughout the program, starting with the Oral Communication GER, Written Communication GER, and culminating with the CSCE A470 Capstone course. Creative and Critical Thinking is required in almost every course, where problem solving skills and algorithm design and development are necessary to complete class assignments and projects. Intercultural Fluency is targeted through the Alaska Native-Themed GER with additional exposure in Social Science GER courses. Personal, Professional, & Community Responsibility are discussed primarily as part of the CSCE A470 Capstone class where students are required to complete assignments focused on ethics and societal topics related to computing. Such ethical and societal topics are especially important in an age where machine learning and artificial intelligence algorithms are quickly becoming pervasive.

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

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

i. BS Computer Systems Engineering

- *1) Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; 2) 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) Communicate effectively with a range of audiences, including technical and non-technical audiences for business, end-user, client, and computing contexts; 4) 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) Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; 6) Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; 7) Acquire and apply new knowledge as needed, using appropriate learning strategies.*

Describe your key findings for these outcomes. (3000 characters or less)

For each student learning outcome, we measure student performance in several classes. Recently, the results have been difficult to interpret with confidence due to a) low student enrollment and b) the COVID-19 pandemic which inhibited data collection (no data collected for CSCE A465 and CSCE A470 during AY2019-2021).

And for the first time, we had no CSE students enroll in the CSCE A470 class during AY2021-2022. This means that two key sources of assessment data, CSCE A470 and the Exit Survey, are missing from the most recent academic year of data.

An additional caveat is that for CSCE A465, the assessment data were not disaggregated by degree, so CS students were included with the CSE evaluations.

For each learning outcome, samples of student work are rated as Poor, Developing, Satisfactory, or Excellent. The below numbers represent the average percentage of students from AY2016-2017 through AY2021-2022 that are rated as Satisfactory or Excellent for each learning outcome.

Outcome 1: 62%

Outcome 2: 80%

Outcome 3: 97%

Outcome 4: 91%

Outcome 5: 98%

Outcome 6: 57%

Outcome 7: 70%

We are pleased with the student performance on learning outcomes 2-5, and have identified outcomes 1, 6, and 7 as areas requiring monitoring and attention.

Describe actions taken to improve student learning for these outcomes. (3000 characters or less)

For outcome 1, we made changes to the introductory curriculum by adding CSCE A101 to improve fundamental programming skills early in the curriculum. See the above discussion of this change for more information and early results.

For outcome 6, we have added more engineering and data interpretation problems to CSCE A342.

For outcome 7, we have decided to emphasize continuous learning as part of the Capstone class and monitor this outcome in case additional changes are required.

Describe evidence that these actions are working. (3000 characters or less)

Outcome 1: As demonstrated by the DFW data presented above for CSCE A201, we are optimistic that our curriculum changes are working. Since these changes were made to the introductory sequence of courses, it will take another year or two before we can see the effects in the student learning outcome assessment data.

Outcomes 6 & 7: These changes were recently made and affect upper division courses, so the changes will hopefully be evident starting in the next academic year.

- 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. (3000 characters or less)**

Since 2007, the BS CSE program (and its predecessor, the BS in Engineering with a concentration in CSE) has been continuously accredited by the Computing Accreditation Commission of ABET. This is a robust accreditation process with high standards. For instance, ABET Criterion 5 requires us to show that our curriculum is modern and rigorous, and Criterion 4 requires us to show continuous improvement in student outcome attainment. At each required review period, we have met or exceeded these standards. The last campus visit was in the fall semester of 2022.

The BS CSE curriculum is continually reviewed and frequently updated to maintain high quality and relevance. For example, we recently added CSCE A101, Introduction to Computer Science, as a required class. This course is taught using the Python programming language, a popular language and relatively easy to learn. Our goal in making this change was to improve the pass rate and increase student retention. As discussed above, we are seeing initial signs of success from this action.

Our Machine Learning class, CSCE A415, provides an example of a course in high demand both within and beyond the major. It consistently attracts large enrollments, of which about 15% are either graduate or undergraduate students in non-computer science disciplines. These students have said that the machine learning class is highly relevant to their field, or that there is high demand for this expertise in their workplace. One of the fastest growing disciplines in computer science is machine learning, a field applicable across most engineering and science disciplines.

The Computer Science and Engineering department has strong ties to State and business organizations. The advisory board members represent local companies and organizations such as Resource Data Inc, AlaskaUSA, Anchorage School District, McKinley Capital Management, and 18F. Furthermore, we have developed research connections with companies such as Axiom Data Science and ConocoPhillips, and government agencies such as NASA, NOAA Alaska Sea Grant, NSF EPSCoR, Department of Homeland Security (DHS) Arctic Domain Awareness Center (ADAC), UAF Alaska Center for Energy and Power (ACEP), and the UAA Institute for Circumpolar Health Studies (ICHS). We also have strong connections with the Alaska Developers Alliance and recently held a joint Duckiebot competition with them.

- 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. (3000 characters or less)

For the Junior Graduate Rate, the percentage doubled from 2021 to 2022. Though we are pleased with this positive trend, we are hesitant to draw any firm conclusions since the percentages are calculated from a small number of students. Raw numbers were not available from IR for this report.

As discussed above, we are pleased to see the increase in the lower division Course Pass Rates, especially after we implemented the curriculum change adding CSCE A101. Introductory computer science courses commonly have low pass rates, so this is a welcome increase. Indeed, these pass rates for lower level courses are now more in-line with the national average of 68% for introductory computer science courses (Watson & Li, 2014).

The upper division Course Pass Rates do not show a similar upward trend, but this is not surprising since we did not target our curriculum changes to upper division courses. Hopefully fewer students are failing the lower division courses and that those that make it to the upper division courses are better prepared. If this is the case, we may see higher pass rates in the future, but this is not guaranteed.

Reference:

Watson, C. and F. Li, (2014). "Failure rates in introductory programming revisited" ITiCSE '14: Proceedings of the 2014 conference on Innovation & technology in computer science education. pp 39–44. <https://dl.acm.org/doi/10.1145/2591708.2591749>.

- b. 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.] (3000 characters or less)**

Our graduates have little trouble finding employment, which is not surprising given both the state and national demand for computing professionals, as well as the quality of our graduates. For students interested in graduate studies, UAA BS CSE Alumni have had good success in being admitted to Computer Science graduate programs at prestigious universities, including Carnegie-Mellon University and Concordia University.

Computer Systems Engineering students often complete internships with local and regional employers. BS CSE students have recently participated in internships at NASA Langley, Federal Aviation Administration, and GCI. BS CSE graduates go on to work as systems engineers, computer network architects, computer systems administrators, and computer engineers for employers such as Intel Corporation, the Alaska Railroad Corporation, Assistive Technology Group, Statlab Medical Product, and University of Alaska Anchorage.

Based on a 2018 survey of recent (2008-2017) graduates from CS&E, 78% of respondents reported being currently employed in the computing field. Furthermore, nearly three quarters

(70%) were interested in pursuing a Master's degree or were already enrolled in a Master's program.

In Anchorage and beyond, demand currently exceeds the supply of locally produced BS CSE graduates. This need is echoed by our Computer Science & Engineering Industry Advisory Board and state and national statistics. The Alaska State Department of Labor and Workforce Development forecasts an increase in demand for computer occupations of 6-11% through 2030. Depending on occupation, the average annual wage in 2022 was at least \$83,000 and as much as \$113,000.

References:

Department of Labor and Workforce Development, Research and Analysis Section (2022). "Alaska Occupational Forecast 2020 to 2030"

<https://live.laborstats.alaska.gov/modules/custom/occupations/files/occfctst.html#15>.

U.S. Bureau of Labor and Statistics (2022). "State Occupational Employment and Wage Estimates Alaska" https://www.bls.gov/oes/current/oes_ak.htm#15-0000.

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, Number of Program Graduates Who Return to UAA to Pursue an Additional Program, and Gap between Job Openings and Degree Completions. (Note: Gap between Job Openings and Degree Completions not required for AY23 Program Reviews.) (3000 characters or less)**

The Ratio of Out-of-Discipline Credit Hours to Total Credit Hours numbers range from 1.1% to 5.4% with little discernable trend. These numbers indicate that most students taking our courses are in the major. While we do attract general interest in some of our introductory courses, few students progress to upper division courses unless they are intending to earn the CSE degree.

We also draw out-of-major students due to other program dependencies. The BS Electrical Engineering program requires the following courses taught by Computer Science & Engineering faculty:

1. CSCE A201 Computer Programming I
2. CSCE A248 Computer Organization and Assembly Language Programming
3. CSCE/EE A241 Computer Hardware Concepts
4. Advanced engineering electives: CSCE A365, CSCE A445, CSCE A465

In addition to the BS EE degree, the BS Geomatics degree has a Geographic Information Systems (GIS) track that requires the following courses:

1. CSCE A101 Introduction to Computer Science

2. CSCE A490 Special Topics

As another example, the CSCE A415 Machine Learning course attracts undergraduate and graduate students from across the university since it is a cross-disciplinary course that is in high demand. Students from biology and geomatics regularly enroll in other courses, such as CSCE A490 Geospatial Programming.

Regarding other metrics, there appears to be an increasing trend in the Number of Program Graduates Who Continue Education, but the numbers are too small to draw any strong conclusions. There is no trend in the Number of Program Graduates Who Return to UAA to Pursue an Additional Program. This is expected since we do not currently offer a dedicated graduate program at UAA related to CSE.

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. (3000 characters or less)

There is not a clear trend in the Five Year Degree Awards Trend. We expect an updated version of this table to have at least 2 additional students added to the 2022 value (for a total of 3) based on Fall 2022 graduates. With those additions, and an expectation of 4-6 graduates in 2023, the number of BS CSE degrees appears to be stable over time. This estimate is based, in part, on CSE student enrollment in the CSCE A470 Capstone class. There were 4 CSE students in the F22 Capstone class, two of whom graduated that semester and there are currently 3 CSE students in the S23 CS&E Capstone class. We expect additional CSE students to enroll in the F23 Capstone class.

Though we would prefer to see an increasing trend, we are pleased that the numbers are not trending downward given recent UAA enrollment trends.

For the Student Credit Hours per Full-Time Equivalent Faculty (SCH/FTEF), there is clearly an upward trend from 2018 to 2022, increasing from 487 to 657. This significant increase in SCH/FTEF is encouraging, and well above the UAA campus average of 463.5 in 2019. Similarly, the Full-Time Equivalent Student per Full-Time Equivalent Faculty (FTES/FTEF) metric mirrors this increasing trend, rising from 16.3 to 21.9 and is well above the UAA campus average of 15.7 in 2019.

We will continue to monitor these metrics, but the upward trend suggests we are on the right track.

Optional: Discuss the extent to which, if any, extramural funding supports students, equipment, and faculty in the program. (2500 characters or less)

Several of our faculty members are actively engaged in research activities. These external funding sources (e.g. NSF, NIH, NOAA Alaska Sea Grant, ConocoPhillips) provide funding for undergraduate research projects, equipment, and faculty course buyouts.

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? (2000 characters or less)

The University of Alaska Fairbanks (UAF) offers a BS program in Computer Engineering within the Department of Electrical and Computer Engineering. The UAF student body differs substantially from our students at UAA. UAF students typically live on campus and are full-time students, whereas our students frequently commute from Anchorage, Eagle River, or the Mat-Su valley and are working part-time or even full-time. Though there are similarities between the programs (as expected given they are both accredited by ABET), the UAF program has more of a focus on hardware/electrical engineering, whereas the UAA BS CSE program is more focused on computer science topics.

As mentioned above, we collaborate with the UAF department to offer common courses at the other campus using distance delivery. We have been at the forefront in such course sharing both in terms of the number of courses and volume of students. The UAF CS department has lost several faculty in recent years, and so such cooperation helps deliver courses efficiently and meet demand.

Specifically, CSCE A385 Computer Graphics has been offered both at UAA and UAF (via distance education), CSCE A360 Database has been taught via distance to UAF from UAA, CSCE A448 Computer Architecture has been taught via distance to UAF from UAA, and CSCE A331, Programming Language Concepts, has recently been delivered by UAF. Such arrangements are intended as cost-saving measures, making better use of faculty resources at both universities.

The introductory course CSCE A101 is occasionally offered at the Mat-Su College satellite location in addition to the UAA location.

Even with the program at UAF, there are not enough graduates to fill the needs of Alaska employers. With 70% of UAA BS CSE graduates accepting employment in Alaska, growing the BS CSE program will result in more students placed into stimulating and lucrative careers.

8. Assess the strengths of your program and propose one or two action steps to address areas that need improvement. (3500 characters or less)

The Computer Systems Engineering program at UAA is maintaining strong enrollment, helping to fill an urgent gap in computing professionals within the state of Alaska. Since its inception as a separate degree program in 2016, the BS CSE program has shown steady growth and our students have little trouble finding employment within the state, specifically Anchorage. Moving forward, we expect the number of students enrolling in UAA's BS CSE program to remain steady or grow over the next several years. We have strong demand from students to continue to offer our high-quality degrees, and we are delivering the degrees with higher than average SCH/FTEF and FTES/FTEF ratios.

Computer Systems Engineering is currently among the best career choices in the US. Looking forward, we hope to expand the number of students graduating from our degree programs through outreach and recruitment efforts. By increasing the number of students graduating with computing degrees, we can help to fulfill the needs of Alaska employers and enable Alaskans to contribute meaningfully to the betterment of society. To help make our graduates competitive, we will

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maintain the high quality of teaching, course offerings, and supporting organizations such as student clubs and the newly created Alaska Data Science and Artificial Intelligence Lab.

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: Frank Witmer

Date: 2/27/2023

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, and to uaa.ooo@alaska.edu. 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. (2000 characters or less for each recommendation)

Recommendation 1: Conduct an analysis of the high attrition rate and develop a plan to address it.
Recommendation has been met.

The program is commended for taking the serious step of adding CSCE A101 to its curriculum. This does seem to be having a measurable, positive effect on the DFW rate in CSCE A201, and also on retention. CSCE A201 remains a relatively high DFW class, although we do acknowledge the point that introductory programming classes only have around a 68% pass rate nationwide (see reference in question 4a).

Recommendation 2: Monitor the progress of students, identify hurdles/bottlenecks toward degree completion, and take any necessary actions to ensure students will be successful completing the degree. Recommendation has been met.

The program is commended for removing unnecessary restrictions on the Tier II WRTG GER, and for focusing on engagement and community building through student clubs.

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

2. Centrality of the Program. (1750 characters or less)

We concur with the program's analysis of its centrality to UAA's mission.

3. Program Quality and Improvement (1750 characters or less)

There were substantial improvements made to the assessment procedures in the program as part of the preparations for the ABET reaccreditation visit (program Self-Study completed July 2022, campus visit October 2022). For example, as mentioned with CSCE A465, assessment data must always be disaggregated by major. We are confident that these changes and improvements will be maintained moving forward and will improve the program.

4. Student Success and the Closing of Equity Gaps (1750 characters or less)

We concur with the program that it is difficult to draw firm conclusions from the numbers provided by IR, especially since they are given as percentages only. One recommendation would be to consider similar figures for the entire department, which would include the BA/BS in Computer Science. For closing equity gaps, it makes sense to focus on lower-division, high-DFW courses which are common between the two programs.

5. Demand (1750 characters or less)

We concur with the program's conclusion that its graduates are in high demand (this conclusion also agrees with nationwide trends). We also acknowledge the program's conclusion that the numbers for the BS CSE program are too small to allow confident conclusions to be drawn on details such as students in post-graduate employment or graduate school.

6. Productivity and Efficiency (1750 characters or less)

We do not believe that it is possible to separate productivity and efficiency between the BA/BS CS and the BS CSE. The BS CSE program is viable, even though it is a very small program, in large part because it is taught by a department which also offers the largest baccalaureate program in CoEng. This allows the department to take advantage of efficiencies of scale, since there is a lot of overlap between the two programs, especially in the lower-division classes.

7. Duplication and Distinctiveness (1750 characters or less)

We concur with the program's conclusion that it is filling a need within the state, especially given that the UAF CEM Computer Engineering program is much closer to EE, and we commend its collaboration with the Computer Science and Computer Engineering programs at UAF College of Engineering and Mines. This collaboration has been beneficial to students and faculty on both campuses.

8. Strengths and Ideas for Moving Forward (1750 characters or less)

We concur with the program's assessment of its strengths, and with its plans for moving forward. In addition to the plans articulated by the program, we would recommend (in accordance with ABET EAC Criterion 2) that the program make a special effort to reestablish regular meetings with its Advisory Board and incorporate its feedback into plans for future continuous improvement. The program has correctly observed that there is a strong need for computing professionals in the US job market currently. Feedback from the constituencies represented on the board (alumni and employers) will be vital to maintaining program currency. Also, while the program has done an excellent job improving student engagement through student clubs at the department level, we

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acknowledge that college- and university-level action is also needed to address the items discussed in this Program Review Form. We recommend that the program engage in college- and university-level initiatives (e.g. job shadowing, the Learning Assistant program) to improve student success and retention with its participation and, when appropriate, constructive feedback.

Dean's Final Evaluation

I commend the program for: (number and list the specific commendations in the narrative box, 1500 character limit)

- 1) Taking serious curricular action in the form of adding a new class (CSCE A101) to improve the pass rates on CSCE A201, historically one of the highest DFW classes at UAA.
- 2) Making marked improvements to its assessment procedures in preparation for the 2022 ABET reaccreditation visit.
- 3) Hosting a successful ABET visit in fall of 2022 which all signs are indicating will result in successful reaffirmation of accreditation when the ABET commissions meet in July of this year.
- 4) Truly engaging with the process of Program Review despite the difficulty of analyzing trends in such a small program.

I recommend that the program: (number and list the specific recommendations in the narrative box, 1500 character limit)

A few corrections: 1) re: Recommendation 2, Actions taken, all students must still take WRTG A111, but they may choose among any of the Tier II WRTG courses for their second semester. 2) In response to Q8, while enrollments have been steady, the numbers are relatively small. Enrollments are not strong.

In addition to the plans articulated by the program, we would recommend (in accordance with ABET EAC Criterion 2) that the program make a special effort to re-establish regular meetings with its Advisory Board and incorporate its feedback into plans for future continuous improvement. Also, while the program has done an excellent job improving student engagement through student clubs at the department level, we acknowledge that college- and university-level action is also needed to address the items discussed in this Program Review Form. We recommend that the program engage in college- and university-level initiatives to improve student success and retention with its participation and, when appropriate, constructive feedback.

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

6/27/2022

Proposed next regular Program Review: AY2028

After completing the Dean Section above, the dean should enter their name, date, and email this form to the committee, and to uaa.oaa@alaska.edu. 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: 3/26/2023

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: Frank Witmer

Date: 4/3/2023

END OF PROGRAM OPTIONAL RESPONSE SECTION

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.

6/27/2022

Provost's commendations, additional or adjusted recommendations, if any, and other general comments (3000 characters or less):

I agree with the dean's commendations and in particular want to recognize the program's proactive and effective curricular interventions to improve student outcomes and retention. I agree with the dean's recommendations, and also ask the program to continue to track the impact of the curricular changes on student learning and success. Consider implementing Transparency in Learning and Teaching (TILT) in at least one assignment or activity for each of UAA's core competencies.

As I did last year in the Program Review process, I am asking programs to think about how they put students first. This includes continuing to monitor any courses with high DFW rates and seeking out strategies for remediation as needed. It also includes continuing to think about what it means to embrace diversity and inclusivity on the course and program level and to demonstrate this in your particular program(s). This could be through the use of proven, high-impact practices at the program level, or through proven pedagogic strategies such as designing assignments using Transparency in Learning and Teaching (TILT). It can also be through implementing OER and ZTC materials, particularly where course materials can be more reflective of diverse perspectives, or by using the same materials across all sections of a course. Finally, I am asking that every program identify at least one opportunity for students to develop each of UAA's core competency within the program's curricular and/or co-curricular offerings.

The next review will combine the BS Computer Systems Engineering and the BA and BS Computer Science degrees in a single review in AY29.

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 year: N/A

Follow-up Program Review year: N/A

Next regular Program Review: AY2029

Provost's signature:



Date: 5/12/2023