Submission date: February 7, 2020

Program/s in this review: Architectural and Engineering Technology (AET) AAS

Specialized accrediting agency (if applicable): As a support program for Construction Management - American Council for Construction Education

Campuses where the program is delivered: University of Alaska Anchorage

Members of the program review committee:

> **Joel Condon, Director/Associate Professor, ANC**
> **Brian Bennett, Professor, ANC**
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1. **Centrality of Program Mission and Supporting Role (700 words or less)**

As a result of prioritization, the Architectural and Engineering Technology (AET) program was identified as a low enrollment program, in need of revision. In May 2016 a review team proposed two options: 1) use the program as a foundation for architectural studies and 2) develop a wide-ranging digital technologies program. Ex-Provost Gingerich rejected developing the program architecturally and instructed faculty to develop the digital technologies option. In October 2017, AET Professor Ellen McKay declined to pursue the redesign of the program stating, "[there] is no clear career path for students with an associate's degree in digital technologies."

Interim Provost John Stalvey, issued a directive in Aug. 2018 to make a curriculum revision, "that responds to state, industry, and local employer needs." A meeting with industry representatives convened on Nov. 2, 2018 to discuss the issue.

Historically, the AET curriculum was oriented around training drafting technicians for the Architecture, Engineering, and Construction (AEC) industry. Industry representatives noted that such positions are losing relevance. Digital technology has made strident inroads into the AEC industry and the drafting work that once occupied drafting technicians is now largely handled by design professionals, from initial design to construction documents. While there is still a need for entry-level personnel, broader critical design thinking skills are now required. This shift in the industry and the corresponding decline in job openings is likely the cause of the decline in the number of students in the program.

Based on extensive analysis of WUE (Western Undergraduate Exchange) accredited architecture programs and members of the Coalition of Community College Architecture Programs (CCCAP), the AET program was revised to reflect curriculum typically found in the first two years of an architectural education, establishing an academic/career pathway for students interested in continuing pursuit of a bachelor's degree and professional licensure.

Though use of design and modeling software remains a strong part of the AET curriculum, a more

comprehensive understanding of design strategies, and the ability to formulate solutions to complex construction problems, has been incorporated into the curriculum. It is becoming progressively more important for industry participants to have more than a simple mastery of digital tools: tools that are constantly changing as the technology evolves. The AEC industry is looking for individuals who are able to embrace a variety of tasks, who are adept at independent, creative thinking, who know how the built environment works, how to build it, and how to translate design ideas into buildable projects.

According to data from UA Statewide and UAA Offices of Workforce Programs provided to the Board of Regents on September 5, 2018, there is a shortage of fifty-nine architects in Alaska each year. The revised AET program seeks to rectify this disparity by providing preliminary architectural training that can be applied to continued education and eventual architectural licensure.

The AET program provided the foundation on which the Construction Management (CM) program was built. The two are still closely intertwined with 46% of the core courses required for the Bachelor of Science in CM being AET courses. More than 50% of the core courses required for the Associate of Applied Science degree in CM are AET courses.

2. **Program Demand (including service to other programs), Efficiency, and Productivity (7 year trend; 1400 words or less)**

Following is an analysis of each AET program data point provided by UA Institutional Research (IR):

Seven year degree and/or certificate awards trend
This IR data point shows that in 2015 enrollment in the AET program began to decline. This triggered suspension of the program during the ensuing prioritization process. This also corresponds to the beginning of Alaska's regional recession in the summer of 2014. The upward trend in 2019 is a reflection of the impending completion of the teach-out process at the end of spring semester 2019 and the push to get the remaining students through the program.

Credits per Degree (Average Credits Earned)
As credits earned approaches the ideal target of 60 for an AAS degree, the downward trend indicates that students are getting better advising. Starting in fall of 2017, Student Success Advisors were hired into the CTC divisions. The 18% decline in credits from 2016 to 2017 and the 30% decline from 2016 to 2019 shows the impact that quality advising has in keeping students focused on their educational objectives and carefully tracking their progress.

Seven year majors or program enrollment trend
This decline clearly shows the impact that suspension had on the program. From a robust enrollment of 68 majors in 2014, enrollment was slashed 76% by the time teach-out was nearly complete. Enrollment began dropping dramatically as suspension took hold with a precipitous 30% drop between 2016 and 2017 and a 49% drop between 2017 and 2018.

Internal demand
Around one third of the AET program is comprised of students from a different major. This strong outside demand reflects the fact that the AET program and the Construction Management (CM) program are closely linked. 46% of the core courses required for the Bachelor of Science in CM are AET courses. More than 50% of the core courses required for the Associate of Applied Science degree in CM are AET courses.

Seven year Student Credit Hour (SCH) production trend
In 2017 the AET program was placed in suspension due to the prioritization process. It can be seen that until 2017, SCH averaged 1040.8. The program was relatively robust up to this point. After being placed in suspension, the credit hours fall precipitously, as would be expected.

Student Credit Hours per Full Time Equivalent Faculty
The Student Credit Hours associated with each Full Time Equivalent Faculty member is trending upward. This indicates that more student time is being invested in each faculty member's class, meaning that class sizes are increasing and program efficiency is improving.

Enrollment per Full Time Equivalent Faculty
This data indicates that class sizes are increasing and that program efficiency is improving.

Full Time Equivalent Students per Full Time Equivalent Faculty
Interestingly, 2017 shows the highest ratio of students to faculty over the seven year period, the program's most efficient year. This is the same year that the program was placed in suspension and the teach-out process began. From 2017 to 2019 the decline can be seen as suspension's impact on the program.

Class Size (Average Class Size)
The upward trend shows increased program efficiency.

Cost per Student Credit Hour
The cost of maintaining the AET program has remained relatively constant over time. This indicates a stable program with established infrastructure and steady operational costs. The relatively high operational cost is partially due to the cost of computers and licenses for state-of-the-art digital software. It is also attributable to the nature of faculty who are highly experienced full professors.

Tuition Revenue per Student Credit Hour
Tuition costs have been increasing at a rate of 5% per year since 2015 according to UA data. The Institutional Research data numbers are relatively consistent with that trend.

External Demand
A significant majority of AET students continue their education after graduating with the AAS. The low pay and low annual openings indicate that the drafting profession is waning. This is consistent with anecdotal evidence from industry representatives who say that, due to advances in technology, the drafting side of production is being subsumed into the design phase, which is done by licensed professionals. It is assumed that AET graduates who are in the workforce find that opportunities for advancement are limited and that a degree in another field might provide a more bountiful career pathway.

Due to this trend, the AET program underwent a major revision which was implemented in fall 2019. The program is now focused on critical design thinking, preparing students for the many various tasks confronted in the design process. The curriculum is based on a typical set of classes found in the first two years of a professionally accredited architecture program. This establishes an educational/career pathway and cultivates skills needed to work as support personnel for design professionals.

3. **Program Quality, Improvement and Student Success (1500 words or less)**

The AET program has experienced a tumultuous three years since it was targeted for suspension during prioritization in 2016 and scheduled for teach-out by close of spring semester 2019. The review team that was convened in 2016 made, as its foremost recommendation, the following:

> *The AET program is caught in the paradox of providing curriculum that is valuable to the AEC industry without providing a professionally recognized degree to students. AET curriculum is similar to the first two years of an architectural education but does not lead to an architecture degree. Therefore:*

> ***Consider using AET as a foundation on which to build an architecture program.***

In June of 2016, then Provost Sam Gingerich declared, "UAA will not pursue a pre-architecture program at this point in time, and this should not be part of the [...] proposal." Provost Gingerich directed faculty to develop AET into a general, digital technologies program. Senior AET Professor Ellen McKay declined to make such changes stating, "[there] is no clear career path for students with an associate's degree in digital technologies."

In August 2018, as AET entered its final year, Interim Provost John Stalvey reviewed AET's status and issued the following directive:

> *Given that this program was one of the most subscribed associate's degrees in the college and that there is demonstrable state need, my recommendation is that the program move forward with a curriculum update that responds to state, industry, and employer needs.*

On November 2, 2018 a group of industry representatives was convened to discuss updates to the AET program. It was agreed that the program should be aligned with the first two years of an accredited architecture program in order to provide students with a clear academic path if they were to continue their education and work towards professional licensure in architecture. They would continue to receive training in the digital technologies used in the architecture, engineering, and construction industries, qualifying them to work as support technicians in the industry.

Following the industry representatives meeting, an extensive study of Western Undergraduate Exchange (WUE) universities was conducted. Architecture courses were tabulated, analyzed, and compared, leading to a sequence of courses that emulated the first two years of a typical architecture program. Courses from other departments at UAA, such as Art, were incorporated into the curriculum while studio courses in critical design thinking needed to be developed from scratch, based on representative courses from accredited architecture schools. The resulting curriculum is an innovative mix of new and existing UAA courses: a program based on the latest and best in architectural education.

With an AAS degree, AET cannot be an accredited architecture program. The National Architectural Accrediting Board (NAAB), the only architectural accrediting body in the U.S., only accredits schools with Bachelor of Architecture programs or higher. However AET is designed to feed into NAAB accredited programs. Its structure is meant to allow UAA students to transfer into other architecture programs as juniors. The assessment measures set up for the AET program is designed to satisfy Student Performance Criteria establish by NAAB. With the design and preparation of the revised AET curriculum, it is hoped that enrollment numbers will justify the exploration of developing a Bachelor or Master of Architecture program at UAA. Alaska is one of only two states in the U.S. without an architecture program. As the only state located in the arctic, with some of the nation's most severe and challenging geographic and weather conditions, it would make sense to encourage the cultivation of this new and innovative AET program.

As mentioned earlier, AET and CM share many of the same courses. As part of CM's Strategic Plan, all CM courses were to be developed for distance delivery by 2022. CM is on track to achieve this goal and, *de facto*, many of the AET courses will have also been developed. With this advantage, AET is in excellent position to act on the momentum generated by the CM program and develop all its courses for online delivery.

The AET program shows increased levels of efficiency as seen in the above IR data. Student Credit Hours to Full Time Equivalent Faculty (FTEF), Enrollment to (FTEF), and average class sizes all are trending upwards. This indicates a program committed to improvement and capable of adapting to tighter budgetary constraints.

Enrollment in the AET program has been trending downward which is largely due to being placed in suspension in 2017. The decline should also be considered in light of general demographic trends. Statistics from the World Population Review website show an overall decline in Alaska's population and a 3.2% decline in the Anchorage population since 2015. It should also be remembered that the state entered a recession in the summer of 2014. Tighter economic circumstances may discourage prospective students from spending money on school. The *2017-2018 Fact Book* published by UAA Institutional Research shows the student headcount at UAA has declined by 12% from 2013 to 2017 (p.14). It is not only the AET program that is experiencing declining student enrollment.

Fortunately, the program is served by a dedicated and highly competent Student Success Advisor. They enthusiastically engage in recruitment activities and carefully monitor student progress. Their contribution to student success is reflected in this student's words to their supervisor:

> [She] is the most knowledgeable advisor I have worked with in over thirty years of college. She knows who to talk to and what needs to be done every time. [...] I want to continue attending college in Alaska, but it doesn't have to be with this institution. [She] is one of the reasons I stay with UAA.

4. Program Duplication / Distinctiveness (300 words or less)

Both the University of Alaska Southeast (UAS) and the University of Alaska Fairbanks (UAF) have drafting programs. UAS offers a Certificate in Drafting Technology; UAF offers an AAS and a Certificate in Drafting Technology. As mentioned earlier, drafting as a profession is waning. Due to advances in digital technologies that integrate drafting into the design process, drafting professionals are no longer in demand. Design is done by registered design professionals who are legally responsible for projects. They can easily render their designs as construction documents: the work that once occupied drafters.

The UAA Architectural & Engineering Technology program offers an AAS but the program has been adapted to the new reality of a changed job market. The UAA program broadens students' skill set to include critical design thinking, requiring students to formulate solutions to a myriad of problems that arise during design. Manipulation of digital software remains a crucial part of the AET program but simple software proficiency is not enough to productively contribute to the complexities of contemporary construction projects and the team dynamics at play in today's work environment.

5. Summary Analysis (500 words or less)

The Architectural & Engineering Technology (AET) program is closely associated with the Construction Management (CM) program. 46% of the core courses required for the Bachelor of Science in CM are AET courses. More than 50% of the core courses required for the Associate of Applied Science degree in CM are AET courses. Although the AET program is not externally accredited, the CM program is accredited by the

American Council for Construction Education (ACCE). Without the AET program, CM could not be maintained as a stand-alone program or retain its accreditation.

The AET program has been revised in response to changing workforce needs. It was originally designed to supply the Architecture, Engineering, and Construction (AEC) industry with hand drafting personnel. Since the introduction of digital modeling and drafting software, the need for drafting technicians has declined dramatically. There is however a persistent need for design skills used by architects and engineers. The September 5, 2018 UA Statewide and UAA Offices of Workforce Programs report to the Board of Regents revealed a deficit of fifty-nine architects annually in the state. The revised AET program is intended to establish a foundation for an architecture program in Alaska.

Graduates of the AET program are educated in critical design thinking skills and able to effectively function as support personnel in architecture and engineering firms. They also have essentially the first two years of an architectural education and an academic pathway established should they decide to pursue an architecture degree and professional licensure.

As an AAS program, AET cannot be accredited by the National Architectural Accrediting Board (NAAB), the sole agency authorized to accredit professional degree programs in architecture. Only Bachelor of Architecture (BArch), Master of Architecture (MArch), and Doctor of Architecture programs can be NAAB accredited. Graduation from a NAAB accredited institution is required to pursue professional licensure. Development of a BArch or MArch program would be the next step in AET's evolution. This would provide Alaska with much needed design professionals and allow Alaskans the opportunity to pursue architecture without having to leave the state and invest tuition dollars elsewhere.

Before developing a NAAB accredited architecture program, it is anticipated that AET will join the Coalition of Community College Architecture Programs (CCCAP). Members of the CCCAP are affiliated with NAAB accredited schools and often have articulation agreements that ensure that graduates with an AAS degree can transfer into the affiliated school at junior level standing.