

Submission date: 02/10/2020

Program/s in this review: Refrigeration and Heating Technologies \_\_\_\_\_

Specialized accrediting agency (if applicable): \_\_\_\_\_

Campuses where the program is delivered: Mat-Su \_\_\_\_\_

**Members of the program review committee:**

Dan Mielke	Assistant Professor	MSC
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**1. Centrality of Program Mission and Supporting Role**

The HVAC/R industry has experienced significant growth in the past and is projected to continue to grow in the coming years. According to the United States Dept. of Labor, "Employment of heating, air conditioning, and refrigeration mechanics and installers is projected to grow 13 percent from 2018 to 2028, much faster than the average for all occupations." In addition to the projected growth in the industry, there are also a significant number of technicians retiring from the trade, which further increases the demand for trained and skilled technicians. Some graduates remain in the state and eventually start businesses that employ others.

Students who obtain the AAS degree are required to take 13 GER credits. This brings students into other classes offered at UAA.

We do not currently have any formal partnerships. However, local trade unions, contractors, and the Mat-Su and Anchorage school districts frequently call when they are hiring new employees. On occasion, union representatives or contractors will visit our classes and give a recruiting presentation to the students.

We have provided 40-hour on-site ammonia refrigeration training for the Alaska Seafood industry in Palmer and Kodiak. We have also provided 1 to 2-day refrigerant recovery training for municipal landfills. To date, we have taught this class in King Salmon, Aleknagik, and Anchorage.

We have also provided 16 hour Refrigerated Seawater (RSW) classes in Homer, Kodiak, and Dillingham to train fishermen and fish tender operators how to operate and troubleshoot RSW systems on their boats.

The only extramural funding we have received has been from TVEP. These funds were used to keep the program current as the industry develops and adopts new technology.

The Bureau of Labor Statistics does not give HVACR jobs a high demand classification, but they project a 13% growth by 2028 which they describe as "much faster than average."

Many of our students are veterans going to school on the GI bill. Every year we train soldiers in HVAC/R to help return them to the workforce. We have an informal arrangement with Job Corps to provide advanced training to their students. They have a program that allows some of their students to continue to live at Job Corps and be funded through their program as they attend a post-secondary training program.

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

As can be seen in the data tables, the number of students seeking the AAS and Undergraduate Certificate varies from year to year. The trend seems to be timed with the local economy and availability of jobs in the HVACR trades. As more work is available, employers become less selective regarding who they hire and will hire people with no experience or training and train them on the job. Consequently, during times of high employment, the number of students tends to drop as they have opportunities to go to work without the time and cost commitment of attending school.

As can be seen by comparing the number of students enrolled and the number of degrees awarded, only about half of the students complete the program and receive a certificate or degree. This also is due to the high demand in the industry. At the end of the first year of the program, the students test for and receive the Environmental Protection Agency's Section 608 certification. This certification is required for anyone working with refrigerants. Most employers prefer to hire technicians with the 608 certification, so it is sufficient to gain employment in the industry. Consequently, many of our students complete the first year of training and get jobs, so they do not return to complete the program.

In 2014 Charter College started an HVACR training program in Anchorage. Many people chose that training option because of their high level of advertising and the fact that their program is short term. Immediately following the start of their program, we did not have any students from Anchorage as they preferred a "closer to home" option. In recent years, we are seeing that trend diminishing. Many employers in the HVACR industry are beginning to see the benefit of a quality training program, and the graduates from Mat-Su have a good reputation in the industry for having a well-rounded education.

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

The HVACR industry is changing rapidly, mainly in the areas of control technology, but also in the areas of energy efficiency. By reading current manufacture's data, trade association publications, and consulting with industry professionals, we stay current with new technology and incorporate it in our curriculum before it becomes common in the industry. As funding allows we also purchase HVACR equipment incorporating the latest technologies.

All of our classes and lab times are scheduled in the evenings to allow students to obtain employment in the industry while they are progressing through the program. This allows them the opportunity to obtain field experience which reinforces their technical training. Some classes incorporate field trips to mechanical sites in order to provide students with exposure to functioning mechanical and control systems. Industry experts are incorporated into some of our classes as guest lecturers, providing our students current perspectives on industry developments. We have also used Community Service Learning projects to engage students in their community while providing valuable field experience.

Our Assessment Plan uses tools which include two required standardized industry exams (NATE Industrial Competency Exam (ICE) and the EPA Section 608 certification exam) and pre-post tests. The standardized industry certifications are repeated annually so, at least in some student learning outcomes, assessment occurs each year. At the end of the spring semester, R&H faculty collaborate to discuss the results of the analysis.

Since 2013, the percentage of students receiving an EPA section 608 certification is over 96%. The testing organization provides a breakdown summary that lists the students' scores by topic. Reviewing this information has enabled the Refrigeration and Heating (R&H) faculty to identify areas of weakness and enhance training on those topics. For the past two years, the section 608 certification exam pass rate was 100%, which is unusual.

While this is encouraging, other factors like class makeup and group dynamics have an impact on overall performance. Our assessment plan goal of 80% of students receiving certification has been exceeded.

The NATE ICE exam pass rate in Commercial Refrigeration has been consistently below our plan goal of 80%, but is far above the national average of 60%. This is a challenging exam and due to the difficulty of the exam, the required passing score for certification is only 60%. While our pass rate has not met our goal, our average overall score of 71% is well above the national average. When we developed our assessment plan, we set pass rate goals of 80% on all the certification exams. This may be too optimistic for this exam considering the national pass rate is roughly 60%. Rather than lower our goals, we have modified the course curriculum to put more emphasis on areas needing improvement. Continued data collection and analysis will determine the effectiveness of these changes

The NATE ICE exam pass rate in Residential HVAC typically exceeds our pass rate goal of 80%, with an average pass rate of 92.8%. Our average raw score consistently exceeds the national raw score average of 62%, which indicates that our student success is above the national level.

In our pre-post assessments, the historical average score on the pre-test is 42.8% and the average on the post test is 80.6%. While this indicates that most students are learning a significant percentage of the material, it also shows that there is room for improvement. By analyzing the post test for questions that are missed at a higher-than-average rate, we are able to identify topics that should be covered more thoroughly to improve student retention of the material.

Due to low participation and student performance in two blended format classes, we changed them to a face-to-face format. These classes are only offered once per year, so there is still not a lot of data collected to see if student success has improved, but so far, the data indicates an improvement in both the pre-post test and the course grades. With continued data collection, we will be able to tell if this is an actual trend and better assess the long-term effectiveness of these changes.

Student success can be defined in various ways. From an academic perspective it is indicated by completion of a program. From a student's perspective in a vocational program, success is defined by obtaining a job in the industry. The HVACR industries are in constant need of trained and certified technicians. Because the students have the opportunity to get their Section 608 certification in the first year of the program, many of them obtain work in the industry and do not return for the second part of the program. When the demand for technicians is low, we tend to have better student success from the academic perspective. Conversely, when the demand is high, students must choose between completion of the program or starting a position in a good paying career, resulting in lower program completion.

Our students have participated in service learning activities with non-profit agencies in the community. This has provided students with practical experience that coincides with their training. It also encourages them to become active contributors to the welfare of their community. For example, we have built a walk-in cooler and performed annual maintenance for the Food Bank of Alaska.

While student advising is officially provided through Student Services, our program faculty often advise students in course sequencing, balancing school, work, and family commitments, and career planning/employment options.

Matanuska Susitna College sponsors a “student showcase” in which students present exceptional projects that were part of their studies. We have had R&H students compete in this event, receiving awards, including one who received first place for creating a model demonstrating an innovative refrigeration concept.

Students in the R&H Program frequently do well enough in their studies to be recognized by being placed on the Dean’s or Chancellor’s list.

The R&H program does not have a specific exit exam, but the national certifications mentioned above provide a benchmark on the success of our students.

Due to the high credit hour requirements for the R&H Undergraduate Certificate, many students who are balancing school, work, and family life find it difficult to complete the requirement for the AAS within two years. These students often return to complete the GERS for their AAS degree at a later date.

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

The R&H Program at MSC is the only one of its kind in the UA system, or in the State of Alaska. Charter College offers a 7-month certificate program, and AVTEC in Seward offers some short-term classes. However, the program at MSC is the only full HVACR option with an AAS degree in Alaska.

#### **5. Summary Analysis (500 words or less)**

The R&H Program has a long history of producing qualified entry level technicians in Alaska’s HVACR industry. This has resulted in a good reputation with employers and makes obtaining work easier for our graduates. We consistently have more requests to hire our graduates than we can fill. We have recently completed a series of curriculum revisions and updated all the program’s Course Content Guides so we are poised to move forward with meeting the industry’s current and future needs.

We have recently reduced the number of OECs offered from five to two, and arranged them so that they can be completed within one academic year. This allows students to focus on training for a year, enter the workforce to gain financial stability, and then return to obtain the other OEC. There are no overlapping classes in the OECs, and they are stackable. If a student completes both OECs and obtains the remaining technical classes, they are eligible for an Undergraduate Certificate. With the Undergraduate Certificate and the required GERS, they can apply for an AAS in R&H.

With Alaska’s loss of oil revenue, funding has been cut for the past few years. While we have been able to maintain quality education at the MSC campus, we have not been able to consider expanding the program. As the HVACR industry continues to expand in Alaska and beyond, we are well positioned to grow with the industry and train technicians in the newest technologies. We have looked into expanding the program to cover the large need for trained technicians in areas of Alaska which are not accessible by the road system. If the current budget cuts are reversed, we have opportunities to provide more training to coastal communities to better serve their HVAC needs and the refrigeration needs of the fishing and maritime industry in outlying areas of the state.

To ensure current content and relevancy of the program, we are considering obtaining external program accreditation through the ESCO Institute. The ESCO Institute is a nationally recognized leader in HVACR curriculum, training materials, and certifications.

To better prepare our students and serve the community, we are looking for options to expand our involvement in service learning. These arrangements provide an excellent opportunity for our students to gain exposure to a variety of equipment, and conditions, beyond what is available in the lab. It can also foster a sense of involvement with their community as they volunteer their time to local non-profits.