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| **PROGRAM NAME:** HVAC Department | **AUTHORING TEAM CONTACT:** Dennis Younkins |
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| GUIDELINES  Time Frames   1. Scope:   The time frame of program review is five years, including the year of the review.  Data being reviewed for any item should go back the previous four years, unless not available.   1. Deadline Dates:   January 15th – Program Review Document due to Department Dean for review (Deans may require submissions at their own, earlier due date)  February 1st – Program Review Document due to Program Review Steering Committee   1. Years:   Years 1 & 3 – Implement Action Plan of (CIP) and collect data  Years 2 & 4 – Analyze data and findings, Update Action Plan  Year 5 – Write Program Review of past 5 years; Write Continuous Improvement Plan (CIP) and create new Action Plan  LENGTH OF RESPONSES: Information provided to each question may vary but should be generally kept in the range  of 1-2 pages or 500-1,000 words.  **EVIDENCE GUIDELINES**: In the following sections, you will be asked to provide evidence for assertions made.   1. Sources: This evidence may come from various sources including professional accreditation reviews, THECB, Texas Workforce Commission’s CREWS, Institutional Research Office (IRO), National Student Clearinghouse, IPEDS, JobsEQ, EMSI Career Coach, and may be quantitative and/or qualitative. If you are unfamiliar with any of these information sources, contact the Institutional Research Office at: [effectiveness@collin.edu](mailto:effectiveness@collin.edu). Use of additional reliable and valid data sources of which you are aware is encouraged. 2. Examples of Evidence Statements: 3. Poor example: Core values are integrated into coursework. (Not verifiable) 4. Good example: Core values are integrated into coursework through written reflections. (Verifiable, but general) 5. Better example: Core values are integrating into coursework through written reflections asking the student to describe how s/he will demonstrate each of the core values in his or her professional life and demonstrated through service learning opportunities. (Replicable, Verifiable)   **FOR MORE INFORMATION:** The Program Review Portal can be found at <http://inside.collin.edu/institutionaleffect/Program_Review_Process.html>*.* Any further questions regarding Program Review should be addressed to the Institutional Research Office ([effectiveness@collin.edu](mailto:effectiveness@collin.edu), 972.599.3102). |

**Introduction/Preface**

EXECUTIVE SUMMARY

**Briefly summarize the topics that are addressed in this self-study, including areas of strengths and areas of concern. (Information to address this Executive Summary may come from later sections of this document; therefore, this summary may be written after these sections have been completed.)** Please do not include information in this section that is not already provided elsewhere in this submission. Using the questions in the template as headings in the Executive Summary can provide structure to the overview document (see below for suggested format).

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| **Executive Summary (suggested sections/format-not required format)**  What does our program do?  Why do we do the things we do: Program relationship to the College Mission & Strategic Plan.  Why we do the things we do? Program relationship to student demand.  Why we do the things we do? Program relationship to market demand.  How effective is our curriculum and how do we know?  How effectively do we communicate, and how do we know?  How well are we leveraging partnership resources and building relationships, and how do we know?  How have past Continuous Improvement Plans contributed to success?  How will we evaluate our success? |

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| **Complete the Executive Summary below after you have completed your review.** The Heating, Ventilation, & Air Conditioning (HVAC) program is designed for students to obtain an associate degree in order to seek technician level jobs in the heating, ventilation, air conditioning, and refrigeration industries. The AAS degree is built upon three stackable certifications designed to allow students to enter into the workforce at matching elevated levels. The varied certification levels built into the program allow gradutes to select different employment opportunities in local or national service, design, commercial refrigeration, industrial air conditioning, and wholesale markets.  The program began with help from Princeton Independent School District (PISD) in 2017, allowing a temporary facility to offer initial basic courses. Collin College began offering general population classes at the Princeton CATE facility during the evening hours, with PISD delivering dual credit courses during the day. Students, many of which worked in the industry during the day, began to build their foundational knowedge taught by the single full-time faculty and eventually building a small team of four adjunct professors.  The program offers hands-on projects to develop the required skills through the theory taught in the classroom and applied in the labs. Along with individual discovery, students also work with peers in the classrooms and labs to solve the problems and tasks given before them. These labs help students discover self reliance and delegation in order to achieve project completion.  Enrollment in the last five years has shown a slow but steady growth. The HVAC program struggled through the Spring of 2020 in the wake of the pandemic. The struggle with repurcussions of the pandemic continued as equipment shortages during and after the pandemic stalled completion of the new labs of the Technical Campus facilities opening in Fall of 2020. With guidance and support of administration, industry leaders, and the HVAC team, labs have been finalized allowing the evolution of applied curriculum. With the advice from our advisory committee board members, the faculty updates curriculum on a regular basis to make sure it stays relevent with our evolving industry. We have also met student needs in terms of class scheduling and better student/equipment ratios in the labs.  The demand for program gradutes is high in the DFW area and will continue to rise in coming years as more companies are moving in the area, construction continues to expand, population grows and the current service technician population ages. We are not able to meet this market demand currently and will probably stay short for another 5 to 10 more years. This has been a historical problem in the State of Texas for both the industry and all Texas community colleges offering training in HVAC since 2000. This shortage does offer great opportunities for the program graduates.  With the transition to the new facilities of the Technical Campus, the program was restructured to make the curriculum effective, current, and fully supported with matching lab facilities. During the third year of the program commercial air conditioning, industrial air conditioning, and testing and balancing classes were added to give our students more exposure needed for advanced career fields. Driven by the input of the HVAC Advisory Committee, these classes help set Collin’s program apart from the more established Dallas College and Tarrant County College programs. The HVAC program’s positive student retention is a leading indicator that we are moving in the right direction.  Greater effort has been placed in the last two years to provide better communication with potential students, and local employers about Collin College’s HVAC program. College website, department website, and program brochures are updated on a regular basis. Changes in the catalogs are made anytime there is a change in the degree plan. Program brochures, flyers for tuition cost are displayed in the hallway boards where the program is housed. The brochures and information sheets are also accessible through department website to all current and potential students. Meetings with faculty and Career Coach about the various options and pathways are made to educate the students. Informational booths are used during the camps and open houses hosted by the department/campus to promote the program and provide information about the low tuition rates and transfer opportunities available.  The HVAC program uses various methods to enlist local businesses to advance program success. Interactions with advisory board members, invitations to industry representatives for class presentations, industry tours by the students, campus open houses, career fairs, exploration of internship/co-op opportunities, etc are some of the partnership activities that have occurred in the last four years.  The equipment and trainer counts match closely with the current class size. It provides each student in the classroom with proper equipment to conduct classes and practice hands-on skills. Courses and lab equipment were planned in advance to maintain a 2:1 ratio, allowing for two students for each piece of major operational lab equipment. Also, the additional equipment and commercially produced trainers increase the faculty’s ability to create new lab experiments for the students to experience. New classes in the restructured degree plan led to positive feedback from our students and the advisory committee members. Our students’ skill set matches with the current industry needs and therefore our graduates are in high demand. Although the program is still in its infancy, and more improvement is needed, positive enrollment numbers show we are heading in the right direction.  The greatest advancement for the HVAC department has come in the hiring and training of five full-time professors. The transitioning from a team of field technicians entering their first time in front of a classroom, to a team of five mildly seasoned full-time professors has played a large role in allowing the HAVC Department to grow and build as it crosses into a higher level of educating the future HVAC techinicians. Organized application of the CIP with this budding department along with the dedication of time to review and enhance curriculum offers a prosperous and positive future for this department. The well utilized investment in the new facilities and supporting equipment was greatly needed and is being heavily utilized. But the training of the personnel delivering the curriculum and the advancements in organization and uniformity allowed by having a well trained team of educators will be the one factor tha stabilizes this department and its future.  We thank the administration and all supporting entities in driving the program review for the HVAC program. With only 5 semesters of instruction at the new facilities and revised degree plan, so much has been learned and built. The process of the Program Review has set a clearer path and greater understanding for the team of faculty driving the HVAC Department as to how it will grow and progress for the next five years. |

Section I. *Are We Doing the Right Things?*

**1. WHAT DOES OUR PROGRAM DO?**  
 **What is the program and its context?**This section is used to provide an overview description of the program, its relationship to the college and the community it serves. **Keep in mind the reviewer may not be familiar with your area**. Therefore, provide adequate explanation as needed to ensure understanding.

*Suggested points to consider:*

* *Program’s purpose (Include the program’s purpose/mission statement if one exists.)*
* *Program learning outcomes or marketable skills*
* *Brief explanation of the industry/industries the program serves*
* *Career paths and/or degree paths it prepares graduates to enter*
* *What regulatory standards must the program meet (THECB, Workforce, external accreditation)*

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| The mission of Collin College’s AAS in Heating, Ventilation & Air Conditioning Technology program is designed to train students to work safely, responsibly, and ethically within the heating, ventilation, air conditioning, and additionally the refrigeration industries. Imparting foundational knowledge and skills will better prepare students for a career in a rewarding and essential trade.  Marketable skills that students will learn during their time at Collin College are the servicing of residential heating, ventilation, and air conditioning equipment. Additionally, the program expands the opportunities into the field of commercial air conditioning, industrial air conditioning, and both refrigeration for commercial processing and commercial food preservation. These pathways all require the knowledge of how to keep equipment performing at peak performance including such basics as air filter replacement, cleaning of heat exchangers, and the use of instrumentation to help evaluate system performance. The safe and proper usage of tools is heavily emphasized. An example being, teaching a student the critical knowledge of how to braze metals together safely using the proper personal protection equipment while also protecting the safety of the work place. Along with the technical hands on portion, students are taught the soft skills that employers expect of them. Effective communication with peers, customers, and time management are all taught skills that students are expected to master.    The course work allows graduates to select different pathways within the HVAC field. Seeking employment as full time technicians with employers that serve both the local and national markets. The core of the curriculum focuses on basic concepts in physics, electrical theory, teamwork, and soft skills to prepare students to become analytical thinkers. The understanding of the analysis of complex mechanical and electrical systems are taught to students to develop and design solutions for many of the challenges that will be encountered in the various fields.  While the goal of the Collin College HVAC program is for all of students to work towards an A.A.S. degree, the reality is that most students are seeking employment within the industry as quickly as possible. To support the students’ needs the program offers stackable certificates that students earn as they progress. Historically, once the level 1 or level 2 certificate has been achieved, 75% or better of graduating students at their respective certificate level move on to their careers. Placement in the HVAC field is seasonal for the residential trades, so a great variation in placement is recognized between Fall and Spring graduations. February and March being the highest months for employment opportunities in the residential air conditioning field. The design of the stackable certifications building into the AAS in HVAC allows students to start in entry positions early and then return without loss of time or education efforts to continue on the pathway to the AAS as their career progresses and additional education is recognized by the employer.  Collin College’s HVAC program currently is not partnered with any external accreditation other than SACSCOC. However, students have the ability to earn an Environmental Protection Agency (EPA) section 608 Technician Certification. This certificate is the first stepping stone for an HVAC student to enter the industry. This certification process has three tiers with a designation of “Universal Technician Certification” for those that accomplish all three tiers. Collin College presently has a 65% average pass rate for Type II certification on the first attempt. Students are granted three attempts total, during which the average rises to slightly over 80% by the second attempt. For most employers this certification is a minimal requirement for employment. Additional third party certifications are offered for 410A Safety Certification, Preventive Maintenance Certification, Green Certification, Propane Certification, HC/HFO Low GWP Certification, and EPA 609 MVAC Certification. When applicable, students are guided to apply for the State of Texas Registered Technician Certification. Some of these third party certifications are required graded activities. Others are offered as extra credit options due to the stipulations of criminal background checks.    The industries served by the HVAC program include environmental cooling and heating, refrigeration of perishables, and process heating and cooling for manufacturing. Career paths students will be prepared for are those as installation/service technicians that service either the residential or commercial markets, laboratory technicians in the testing or research and development sectors, and wholesale industry that specifically supports the industry.  The laboratory technician has been a relatively new pathway that only evolved in recent years. It will be a focus of consideration as the program moves forward. These positions are highly coveted by students as these positions have controlled hours, benefits, and higher pay levels than other entry positions. The laboratory technician also requires unique skillsets apart and beyond those of standard equipment servicing.  Students can transfer their AAS degree in HVAC Technology as the first two years to select 4-year institutions to earn a BAAS degree. The most prominent local option being Texas A&M University in Commerce for the BAAS degree. Ferris University of Big Rapids Michigan offers a similar pathway, but has higher expenses and requirements as their degree is focused on the Engineering of large process refrigeration.  The HVAC program meets all of the requirements of THECB workforce program with 60 credit hours of coursework including a capstone course for its AAS in HVAC. The AAS in HVAC also meets the requirements for being funded by Texas Workforce Commission for student placement and is recognized to qualify for Veteran benefits. The stackable certifications for the HVAC pathway also meet all requirements of these same funding programs recognizing the AAS in HVAC, but with lower funding rates. |

**2. WHY DO WE DO THE THINGS WE DO: PROGRAM RELATIONSHIP TO THE COLLEGE MISSION & STRATEGIC PLAN.**

* **Provide program-specific evidence of actions that document how the program supports the College’s** [**mission statement**](https://www.collin.edu/aboutus/)**:** “*Collin County Community College District is a student and community-centered institution committed to developing skills, strengthening character, and challenging the intellect.”*
* **Provide program-specific evidence that documents how the program supports the College’s strategic plan (2020-2025 Strategic Plan)**: <https://www.collin.edu/aboutus/strategic_goals.html>.

*Suggested/possible points to consider:*

* *What evidence is there to support assertions made regarding how the program relates to the mission and strategic plan?*
* *Think broadly-increasing completion, articulation agreements, pathways from high schools, etc.*
* *Analyze the evidence you provide. What does it show about the program?*

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| **A Student and Community-Centered Institution:**  **Students Centered:**  Success of students enrolled in the Heating Ventilation and Air Conditioning (HVAC) program are the driving force of this program. The HVAC program centers around our students and opening doors to a new future for them in multiple ways. Starting with the advisement of our local HVAC Contractors who meet with the faculty twice a year to give real time input on industry needs as well as conveying the needs within their own company. Local contractors also perform regular classroom visits to discuss the potential of the HVAC field, and real life expectations of the employer for future employees. Multiple companies have generously donated both used and new equipment to support the hands on training of the students. This includes, but is not limited to Century A/C Supply, Trane Corporation, A#1 Air, Johnstone Supplies, ACIS, Levy and Sons, Denali Construction, ABC Pest Pool and Home Services. This equipment allows the student to be technically challenged by practical application and being able to take the equipment apart and “see what makes it tick.”  As a department, we maintain our labs with new equipment, so the student has contact with the latest technology at all times. This equipment opportunity allows for live hands-on learning and gives real world systems to be worked on. Our students are guided by Professors with many years of personal HVAC experience. The professors bring to the table vast knowledge and hands on experience to be transferred to the student unlike a textbook. Real life stories concerning student safety, career paths and roll model examples are provided by the professors. Many students of today are not exposed at home to vocational work environments from parents as in years past. The program offers tailor made lab experiences for our students so they can have a thorough understanding of concepts, while they build on fundamental mechanical skills. The program has many new commercially produced trainers that can show in real time mechanical processes along with see through piping for demonstration of key refrigeration concepts.  Collin College’s Learning Management System (LMS) or Canvas, supports our students by allowing interactive group chat. They can exchange ideas, get help from each other and as a group offer up support when a student becomes stressed or overwhelmed. Canvas supports our students by allowing an organized way of presenting material. Our courses offer up the cohort style of learning. The students stay as a group going through the courses and thus get to know each other and fostering a positive learning environment in the process. Looking forward, the HVAC department would like to sponsor an air conditioning club to allow our students more connection to the school, offer club positions such as President, Vice President and Secretary of the HVAC club to foster leadership within the club and a resume booster for standout students.  **Community Centered:**  The HVAC department offers to the students a dedicated means of contact between employers who are searching for employees and those students actively looking to be employed. The HVAC Career Coach coordinates that effort and also ensures enrollments are processed smoothly.  The HVAC Career Coach directly aids in representing us to the local school districts. The HVAC Career Coach has contacts in over 8 local school districts so that faculty, staff, and students at these schools know about the opportunities that this field provides. As well, the Career Coach is a direction connection to local Economic Development Committees, Veteran Services, Suppliers and Businesses that all help spread the knowledge of our services into the community at a much deeper and more direct level.  The HVAC department participates consistently in the campus open houses enabling community members, prospective students, and parents to see and ask questions directly to our Professors. As time goes on, both our club and program will become more mature with an anticipated shared goal of becoming involved in “Heat the Town” which is a volunteer organization that provides heating and cooling repair for low income families.  This program provides a great path for those families seeking an alternative career path rather than four-year institution.  The program provides three tiers of HVAC Certification all building in an organized and structured manner to an associate’s degree. The certificates and the associate’s degree offer can accelerated entryway into a student’s earning years with little debt and two years towards a four year college path. Collin College has served as local, community based school for over 35 years and the Technical Campus is designed to enhance and support that legacy. Our graduates will benefit our community by becoming locally employed, providing quality local service and supporting the raising of families and livelihoods in the community. Many local contractors need locally trained good students and this program gives them all they need to succeed.  **Developing Skills:**  Collins HVAC program has been designed from the ground up. Every aspect of student learning was taken into consideration before the building was started. Therefore, from the beginning we could give the proper skills to our students. Below is how we preparing our students:   * Good, organized labs with usable equipment to teach with. * Clear and concise instructions on lab exercises. * Qualified Professors with years of field experience to generate the needed knowledge and skills   **Strengthening Character**  Amongst the many detailed means of strengthening the students character, these are several highlights.   * Model the work environment (be on time, prepared to work every day, proper clothes to work in. proper personal protective equipment, etc..) * Give the students tools for self-discipline (Call them out if being disrespectful, disruptive or behavior issues) * Emphasize to the students that how you behave during your school days is how you will perform at your new HVAC job. * Self-Discipline is the best discipline. Turn in work on time, neat clean work, well-spoken to others. Treat others with respect * As a Professional Team of Professors foster a united front to the students. Create a disciplined department that exemplifies the expectations for the students. Show as behavior example. * Let students, help other students in the classroom. Just as one would help your team mates on the job – a workplace collaboration example   **Challenging The Intellect**  The program requires critical thinking, inductive reasoning, problem solving, math skills and independent thinking abilities.  A student’s character and Intellect are strengthened by organized labs and challenging assignments. In the field, most daily work is done on an individual basis rather than by group effort. Therefore, initial emphasis in lab and lab assignments is placed on individual achievement. Students are challenged not only in the lab environment but in the classroom as well by weekly quizzes and tests. Students are expected to be on time, organized, and prepared for their weekly assignments.  Two of the most challenging courses are Residential Air Conditioning System Design, HART 2345, and Testing, Adjusting and Balancing HVAC Systems, HART 2358. These courses challenge students in engineering design of HVAC systems. Students learn the importance of collecting accurate field data for use prior to construction and verification post construction of the quality of install. While individual work is emphasized, collaborative work as a team is also remains a major component of our learning process. This facilitates how to work with others, exchange ideas, and solve problems in a group setting. Participation, whether it be collaborative or individual is key in producing a successful student.  In addition, the program incorporates numerous commercially produced mechanical trainers for demonstrating mechanical concepts, visualizing in real time the refrigeration cycle and to allow the student to solve complex troubleshooting problems. For these purposes, manufactured trainers are far more tactile and visually accessible than a field unit. The use of trainers provides a reasonable simulation of the real world environment but takes away the risk of dangerous faults that may cause harm to the inexperienced student or damage to expensive equipment. Trainers are strategically located right in the dedicated classrooms to allow quick reference and practical use in the lecture process. The use of manufactured trainers also adds to the efficiency of the lab space by compressing large commercial systems into reduce space, all while conveying the needed learning concepts. Investing in manufactured trainers allows the professor to effectively and quickly offer visual information to the student the professor deems to be important. Another aspect of trainers is ease of use. The trainers allow direct involvement of solving a particular problem without interference of superfluous problems- taking doors off etc.. Application of manufactured trainers allows controlled set up of specific inserted problems for student testing of inserted “bugs” with immediate response and confirmation.  **Strategic Goals**  1. **Improve student outcomes to meet or exceed local, state, and regional accreditation thresholds and goals.**  The syllabus provided to the student clearly states the Student Learning Objective(SLO) for each course. These SLOs are the minimum requirements of the students’ lecture/labs. Each course is carefully designed to provide basic principles that apply to the course being taken. The HVAC team has identified the following measures to improve future student outcomes:   * Link SLOs to specific labs by clearly identifying each lab to the SLO. * Standardized testing from a third party. * Early intervention of failing students to redirect them in a program   **2. Develop and implement strategies to become a national exemplar in program and student outcomes.**  Currently, the basic program is still in development. Due to supply chain issues caused by the pandemic during construction, only 40% of all lab equipment was received and installed prior to the closure of construction funding. The last two years have required the use of operational budget monies to purchase equipment as equipment lines returned to production. The last 60% of equipment has been installed by the Professors during these last few semesters. Final installation of both donated and purchased equipment is occurring during the Spring of 2023. Curriculum has been repeatedly reviewed and updated along the way to match the equipment as acquired and installed. Although the HVAC Program effectively started anew with the construction of the Technical Campus, it has driven a unique opportunity to continuously review and optimize curriculum. The challenges faced by opening during the pandemic have driven a department that has grown with a constant mindset of review and improvement that reached far beyond standardized curriculum review. The HVAC Professors have come to recognize and appreciate that with program being so young, a need remains to stay fluid as different approaches are found improving rigor of the course. These are the forces that drive the HVAC Program to becoming a national exemplar program.  **3. Create and implement comprehensive integrated pathways to support student transitions**.  Students transitioning from high school to college offer a pipeline of potential students that do require individual assessment in entering the program. The nature of HVAC as a career is hazardous. Exposure to high voltage, brazing gases, extreme temperatures both hot and cold on working equipment, and the necessity to perform complex troubleshooting on operating equipment makes this a career choice for very mature individuals. Many dual-credit students lack the maturity from a safety standpoint to begin the program. So, further thought needs to be given to interact with high school transition students more broadly.  Alternate options being researched include establishing a part time work program with area contractors. Students need that hands on reinforcement of information learned in the classroom. As well, this could generate a recruitment pathway that is already filtered to identify strong candidates. Interaction and support from our associated contactors allows a means to tailor needs for the contractor, student and Collin College as work contracts demand.  An important milestone in an HVAC student’s training is the obtaining of the EPA 608 Technician Certificate. This is very important as the student cannot legally work on refrigeration equipment without this certification. It is encouraged for a student to get his certificate early in the program so employers may employ the student as soon as possible. A student that does not have this certificate may not be attractive to an employer thus slowing the progress of employment.  The interaction between Faculty and the Career Coach is an immense value in student placement. Industry contacts and keeping up with employment opportunities provide valued student support. Tracking students is a difficult process as reporting is limiting by student tracking participation. The fact that there is little connection between the program and the student once the student completes the program. Student do not report back to the school job placement that occurs after graduation. So, looking forward, the HVAC Program continues to investigate a means of tracking after graduation.  As indicated by the U.S Labor and Statistics the number of HVAC tech jobs in 2021 were 394,100. The projected outlook 2021-2031 shows a 5 % growth. Based on these numbers and others in this report our job placement at any given time should be a success. We simply need to build a means to document our successes.  **4.Implement the third Baccalaureate degree by Fall 2022 and continue adding 2 + 2 programs with university partners.**  The HVAC department at Collin College at this time has an associates program in place. While we do not have any intention of a bachelor degree focused solely on HVAC, students can pursue a Bachelor of Applied Arts and Sciences (BAAS) at local universities to bridge their AAS in HVAC towards a BAAS degree. This offers a further pathway for the student to progress into management opportunities within the field.  **5.Develop and implement a comprehensive staffing and succession model.**  The HVAC department has been staffed appropriately to support increasing student demand to date. Adjunct faculty provide a valuable lens into the industry as most have a full-time job in the HVAC industry. Part-time faculty often offer the best candidates to support future full-time faculty status since we have established a working relationship and have supported their growth as adjunct professors. Supporting the staffing needs is supported by all members of the HVAC department to leverage relationships and ensure that students have the best possible instruction available.  Present focus is on staffing of the lab support positions. The HVAC Program has over 30 working heating and cooling systems that need constant maintenance and review. As well, commercially produced trainers need specialized attention to be maintained and optimized in the classroom. These are tasks that require a recognized level of HVAC knowledge, but by title do not generate a competitive salary to what is offered in the HVAC field.  **6.Develop a coordinated and systematic approach to engage external stakeholders.**  The HVAC department is continually monitored and changes will be made as necessary based on need. We engage with industry partners to help us learn how to keep our program current. Additionally, these industry partners become important for experiential learning while students complete HVAC courses and after graduation when full-time employment is desired. The HVAC Program routinely engage our external stakeholders systematically with advisory committee meetings and more frequently to help students learn about employment opportunities within different industries through classroom guest lectures. The HVAC Program in cooperation with its designated Career Coach is presently developing a set calendar with timed application of hiring interactions, classroom visits, industry tours and the expected Advisory Committee Meetings. Other pathways are being sought and explored as well. |

**3. Why we do the things we do: Program relationship to student demand**

**Make a case with evidence to show that students want the certificate. Discuss whether or not there appears to be any disproportionate enrollment by gender, race, and ethnicity (compared to Collin College’s overall student demographic distributions** [**http://inside.collin.edu/iro/programreview/prfilehostpage.html**](http://inside.collin.edu/iro/programreview/prfilehostpage.html)**). If any differences exist discuss possible reasons why the gap exists, and plans to address these issues to close gaps in enrollment rates between groups of students (refer to the Program Review portal for Enrollment Reports and Average Section Size data files for your program** **<http://inside.collin.edu/institutionaleffect/Program_Review_Process.html>).**

*Suggested/possible points to consider:*

* *What is the enrollment pattern? Declining, flat, growing, not exhibiting a stable pattern, please explain. For required program courses where there is a pattern of low enrollment (fewer than 15 students), explain your plan to grow enrollment and/or revise the curriculum.*
* *What are the implications for the next 5 years if the enrollment pattern for the past 5 years continues?*
* *Describe any actions taken to identify and support students enrolled in program-required courses early in the degree plan. If no actions are taken at the present, please develop* *and describe a plan to do so.*
* *How does your program support (or plan) to support attraction of a diverse student population?*
* *Check with Institutional effectiveness for Data Reports -names of reports*
* *Analyze the evidence you provide. What does it show about the program?*

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| 1. Despite a timely downturn due to the pandemic, enrollment has been steadily increasing over the past five years. We are currently filling at least two sections for each course we offer every semester. Most often that includes one morning section and one evening section of each course. By design, this allows students the diversity of working wround existing employment and that has historically proven to be a definite asset to the varied student body.  Table  Description automatically generated  2. The graphic above demonstrates that over the previous 5-years the HVAC Program has upgraded curriculum and educational resources to meet the needs of students seeking entry level positions in this highly technical, ever-changing industry.  3. We expect to add additional sections for each of our courses in the near future to meet program growth. Long term targets include the expectation to utilize both lab and classroom facilities mornings, afternoons and evenings four days per week. Additionally, the HVAC Department is considering offering weekend classes to allow fully employed students another option and opportunity to improve their skills and employability at times that will better meet their schedule.  4. HVAC is an open enrollment workforce program. Students typically don’t enroll to pursue a degree. Most are seeking technical skills and employment opportunities. Due to rapid growth in north Texas many of our students achieve those initial personal goals before completing our certificate programs. As the program grows and the value of higher trained employees is recognized by industry, the value of the AAS degree is expected to grow as well.  a) Data from the [US Bureau of Labor Statistics](https://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm) proves this point showing that typical entry level education is a postsecondary nondegree award.  b) Additionally, our research with local HVAC professionals has shown that while there continues to be a very strong demand for entry level employees who have completed a certificate program, there is virtually no industry demand for degreed technicians. As a result, currently very few of our students continue on to receive an AAS after completing certificate programs.  c) We have also identified that TSI is often a barrier to our students progressing beyond the Level I certificates.  Consequently, we are currently providing, and continually seeking, new modules in our classes to help prepare our students to transition into core classes so that in addition to being better prepared to enter the industry, students will also be better prepared to pursue an associate degree.  We are also working to address this issue by developing a plan to help instill a desire in hiring managers to seek degreed candidates. Faculty are already working to emphasize the importance of attaining a degree, and assisting students to graduation.  5. According to the [US Census Bureau ACS PUMS 5-Year Estimate2 from 2020](https://datausa.io/profile/soc/heating-air-conditioning-refrigeration-mechanics-installers), demographics information shows that 98.4% of HVAC technicians and installers are male, 68.2% are White (Non-Hispanic), 12.2% are White (Hispanic), approximately 8% are Black (Non-Hispanic). The Collin HVAC program attracts a diverse student population as shown in the following graphics.  Chart, bar chart  Description automatically generated  Chart, bar chart  Description automatically generated  6. The following graphic shows that our program mirrors industry demographics (as noted above) in that our student program population is very clearly predominantly male. This is the one area where our program differs dramatically from Collin College’s overall demographics.  Chart, bar chart  Description automatically generated  We have recently begun to establish a relationship with a local employer who is a member of the national organization [Women in HVACR](https://www.womeninhvacr.org/). Going forward we must continue to seek additional relationships and work to develop more incentives such as scholarships along with a mentorship program to encourage more female students to participate in our classes. Engaging these students, demonstrating that there is a demand for women in HVAC and Refrigeration, and promoting the fact that the HVAC profession is not limited to males.  Overall, our program currently has a strong relationship to student demand and faculty are committed to continued improvement. |

**4. Why we do the things we do: Program relationship to market demand**

**Make a case with evidence to show that employers need and hire the program’s graduates. Some resources to utilize for information could be: JobsEQ** [**http://inside.collin.edu/iro/programreview/202021/ProgramLaborMarketInfo\_2020-21AY.pdf**](http://inside.collin.edu/iro/programreview/202021/ProgramLaborMarketInfo_2020-21AY.pdf)**, Burning Glass, O-Net** [**https://www.onetonline.org**](https://www.onetonline.org)**, Texas Labor Market Information** [**https://www.twc.texas.gov/businesses/labor-market-information**](https://www.twc.texas.gov/businesses/labor-market-information)**.**

*Suggested/possible points to consider:*

* *How many program-related jobs are available in the DFW Metroplex for program graduates? If the majority of related jobs in the DFW Metroplex require a baccalaureate degree, provide evidence that you have a current signed articulation agreement with one or more transfer institutions or that you plan to develop one.*
* *What proportion of the program’s graduates (seeking employment) found related employment within six months of graduation?*
* *What changes are anticipated in market demand in the next 5 years? Do program completers meet, exceed, or fall short of local employment demand? How will the program address under- or over-supply?*
* *Identify and discuss the program’s strengths and weaknesses related to market demand.*

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| **PROGRAM-RELATED JOBS IN DFW**  The profession of HVAC technician is a career that has been firmly in demand for years. It is a career that is only growing and getting stronger, not getting weaker and replaced by machines. This is shown in the Labor Market Information Collin College Program review from 2020-2021. The review shows that current job employment in DFW, for HVAC technicians, is 9,629 with a projected yearly increase of 210 jobs. That is a 2.2% growth in the industry in just one year, above the area average of 1.6%. The review also displays an unemployment rate of only 144 jobs or 1.5%.    Source: <http://inside.collin.edu/iro/programreview/202021/ProgramLaborMarketInfo_2020-21AY.pdf>  The good news doesn’t stop there. On onetonline.org it shows the HVAC employment numbers for the whole state of Texas. O-net reads that there were 28,460 employed in HVAC-R in 2018. With a projected need of 32,990 employees by 2028. That’s a projected growth of 16% in the state.  O-net continues with reporting the national numbers. As of 2020 there were 380,400 employees in HVAC. By 2030 there will be a need of 399,400 employees across the country. This is 5%, or average, rate of growth.    Source: <https://www.onetonline.org/link/localtrends/49-9021.00?st=TX>  All of theses statistics show that HVAC is a very strong career field with low unemployment and growing job opportunities. Collin College is right to continue to provide and promote this education to it’s students.  **STUDENTS SEEKING/EMPLOYED WITHIN 6 MONTHS**  This is a difficult subject to cover accurately and in detail. The reason this is difficult is, like many of the other programs on the technical campus, our career coaches have very little contact with students after they leave the program and enter the workforce. Despite the difficulty of getting students and employers to report on student success our dedicated Career Coach Sean Sweeden has been able to track some of the numbers. In the table below, you can see that 31 students have gotten gainfully employed in the HVAC field with many companies across the DFW metroplex. Obviously 31 students is a far cry from total coverage on recording the employment status of every student that enters the HVAC program but it is a start. The full-time professors, Coach Sean Sweeden, and our Director Brian Sanders are working on record keeping methods to improve this issue.  The first method to fix a lack of student employment records is full-time faculty taking survey’s of each of their classes of who is employed in HVAC and who is not, then helping those who are not employed in getting a job in the field. The second method the program is investigating is using an online service to track the numbers we input and compare that to state records. Colaboration with other colleges has found that TSTC has access to utilizing social security numbers to track former students via tax records. This method has a great deal of potential to track and offer more accurate data, but is a system with many stipulations to be investigated.    **EXPECTED CHANGES IN MARKET DEMAND OVER 5 YEARS**  In the DFW metroplex HVAC employment is expected to grow over 2.2% each year for the next 5 years. In the state of Texas as a whole it is expected to increase by 16% by 2028, only six years in the future. The HVAC program at Collin College is striving to prepare students to fill these many, many job opportunities. The employers presently working with the HVAC Program are hiring students as quickly as they can get them to sign a contract. This is a very good sign for the ability of the students to prosper quickly in their new profession by meeting local employment demands.  With the program’s wide variety of employers; such as testing facilities like UL, large service companies like ACIS, and small “mom and pop” companies; our range of students have many opportunities to choose from to best meet their abilities and interests. In short, similar to many college programs, there exist excelling students whom go above and beyond mixed in with the students with more a more basic goal to find a good paying job as early as possible. With so many employment opportunities for all of the students, students with varied expectations for employment can be placed in positions that meet their hopes and expectations.  **STRENGTHS AND WEAKNESSES IN MEETING MARKET DEMAND**  As far as over or under meeting market demand in the HVAC field, the department has more job opportunities than students prepared to take them. On Indeed there are 972 job openings under HVAC as of 9/22/22 alone. The only way to address a lack of students is to employ more fulltime professors, expand program outreach to bring in more college freshman, and continue to fund the well-oiled machine that the HVAC department has become. Even during the pandemic HVAC employees were deemed essential workers and continued to work during the lock-down, showing how important this field is.  The HVAC program has several other strengths that set it apart from other HVAC programs. First is that we focus on preparing students to receive an AAS. This is a strength and a weakness as not all students continue to receive the AAS. The AAS produces more rounded and professional technicians who can continue to management positions or company owners. They develop improved skills in writing, communicating with customers, organization and management, as well as a fuller education in the wide field of HVAC. The progam is working on several methods to impress on students the needs to finish the program and receive their AAS. Students that don’t continue on to finish their AAS degree lack those skills previously mentioned that would make them a good fit for management positions.  Another strength the HVAC program has is a diverse background with the current full-time faculty. Each professor comes from a different background in HVAC and are therefore able to give the students a wide range of perspectives on options available to them in HVAC. As an example: between the 5 full time professors all branches of HVAC are covered. Those areas being industrial, commercial, residential, and refrigeration.  Additional Source: <https://www.indeed.com/jobs?q=HVAC&l=Dallas-Fort+Worth%2C+TX&redirected=1&vjk=2ff71ec83411908d> |

Section II. *Are We Doing Things Right?*

**5. How effective is our curriculum, and how do we know?**

**A. Make a case with evidence that there are no curricular barriers to program completion. Review data related to course enrollments, course completion rates, course success rates, and the frequency with which courses are scheduled to identify barriers to program completion.**

*Suggested/possible points to consider:*

* *Number of students who completed the program awards in each of the last 4 years? If the number of graduates does not average 5 or more per year, describe your plan to increase completions and address this issue in the Continuous Improvement Plan (CIP).*
* *At what point(s) are substantive percentages of students dropping out of the program? Use data in the “Program-Based Course Performance” tool to examine enrollment flow through the program curriculum. Does the data suggest any curricular barriers to completion? Address problems in the CIP.*
* *Analyze the course success rates and the course completion rates of each course in your program. Address problems in the CIP.*

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| **ADDRESSING COURSE SUCCESS IN CIP’S**  The next two CIP’s focus on increasing academic rigor and increasing student registration diversity. The first CIP is what applies to the HVAC-R course success and completion rates; increasing academic rigor.  For this young program, increasing class rigor is of the highest priority. Currently completion rates and success rates (grade distributions) are relatively high in comparison to traditional academic course success rates. Consideration in comparing these success rates gives evidence to the possibility that the students could benefit from additional challenges in the academic rigor of the course offerings. The HVAC-R program has taken definite steps towards developing a plan to increase involvement and learning for the program’s students as a whole. As a brief review of the success and completion rates (previously explained in section 5.E) the numbers express that the program’s course are presently well within the learning abilities of the students, thus suggesting room for increasing the present learning level and rigor of the existing curriculum. The tables showing these numbers are below for ease of reference. A note of consideration should be recognized that students progressing into the 2000 level courses have already been filtered to only those students that have shown the dedication to enter a third semester of concentrated HVAC concepts, theories and applications. As such, higher success rates for those upper class course offerings are to be expected and recognized as a collection of excelling students.  The HVAC-R team is reviewing means to improving student testing on course studies and lab practices. As a first step to improve overall testing the program will begin giving tests in person or online in proctored formats to promote academic honesty. This straight forward approach to testing will encourage students to participate more fully in class, in lab, and most importantly in reading and studying the text book and other course resources.  With the need of more full time faculty in the HVAC-R program the implementation of this plan will take several semesters to accomplish. The importance of in person or proctored tests will need to be impressed on the large number of adjunct professors the program has. In addition the full time faculty will have to reevaluate class room time and the topics covered to allow students adequate time to take the tests in class.    Source for AY2017-2021: <http://inside.collin.edu/iro/programreview/202122/GradeDistribution-HVAC.pdf>    Source: <http://inside.collin.edu/iro/programreview/202122/GradeDistribution-HVAC.pdf> |

**B. Show evidence that the institutional standards listed below have been met. For any standard not met, describe the plan for bringing the program into compliance.**

1. **Completers Standard: Average 25 completers over the last five years or an average of at least five completers per year.**  
   Number of completers:  The number of Completers by year and certificate or degree as Follows by year : **Year Level Certificate 1 Level Certificate 2 AAS** 2018 12 2019 28 3 2 2020 43 8 7 2021 111 14 8 With the HVAC Program beginning in October of 2017 we did not have any possible students set to Graduate with an AAS at the earliest of May 2019 if they had their core classes completed. We continue to see a rise in the number of students completing each level of certificates and AAS degrees. There are two main issues we have experienced with the low numbers for completers on the AAS, one being the TSI Exam to complete the AAS Degree, and the second being the demand for the AAS in the industry. Looking at these numbers we also take into consideration when the program was started at the temporary facilities of the Princeton CATE Center, there was a maximum accommodation of thirty-six students. IN the wake of the pandemic and parallel transition to the new facilities, approximately twenty students continued on with the program. The first semester at the new facilities, roughly 50 new students entered the program. The data in the spreadsheet was found in the Measure 2b\_FY2017-FY2021 Certified Awards by CIP. in last five years.  
   If below the state standard, attach a plan for raising the number of completers by addressing barriers to completion and/or by increasing the number of students enrolled in the program. Definition of completer—Student has met the requirements for a degree or certificate (Level I or II)
2. **Licensure Standard: 93% of test takers pass licensure exams.**If applicable, include the licensure pass rate:  **EPA Certification/Licensing Core Pass Rate Type II Pass Rate National Core Pass Rate National Type II Pass Rate 2017 85% 71% 82% 66% 2018 90% 63% 82% 66% 2019 75% 66% 82% 66% 2020 84% 80% 81% 66% 2021 81% 76% 81% 66%**   While the HVAC Program remains below the 93% pass rate for Collin College’s standard, we were at or above the national average, except for one year according to ESCO Group’s statistics. This an exam that requires Students to commit to time for study and preparation for the Exam. The course material is presented to the students in their Canvas Shell and they are encouraged to take time to prepare for the Exam. While we see better numbers in 2017 and then see a decline in 2018 and 2019 we had a larger number of students take the Exam. In 2020 We opened the new Campus and the numbers increased even more. In 2021 we had a larger number of students take the exam and the percentages you see reflect those numbers.   
   For any pass rate below 93% (Collin College’s standard), describe a plan for raising the pass rate.
3. **Retention Standard: 78% of students enrolled in program courses on the census date should still be enrolled on the last class day (grades of A through F).**Include the retention rate: 98 to 100%  
   If the retention rate is below 78%, describe a plan for raising the course completion rate.

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**C. Make a case with evidence that the program curriculum is current.**

*Suggested/possible points to consider:*

* *How does the program curriculum compare to curricula at other schools? Review programs at two or more comparable colleges. Discuss what was learned and what new ideas for improvement were gained.*
* *How does the program curriculum align with any professional association standards or guidelines that may exist?*
* *Is the curriculum subject to external accreditation? If so, list the accrediting body and the most recent accreditation for your program.*

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| *If the program curriculum differs significantly from these benchmarks, explain how the Collin College curriculum benefits students and other college constituents.*  According to the [Texas Higher Education Coordinating Board (THECB)](http://www.txhighereddata.org/interactive/CTCClearingHouse/default.cfm?CFID=130019301&CFTOKEN=86928993) there are many colleges in Texas that offer an associate degree in HVAC. All programs share the same overall goal of providing program completers the skills needed to gain employment in the HVAC and Refrigeration industry. The two programs that are geographically closest to Collin College and most similar in scope were utilized for purposes of comparison. Details of their programs appear in the table below alongside the details of the Collin program.  The SACSOC accredited Collin College HVAC program provides a comprehensive easy to follow pathway for students seeking either a Level 1 or a Level 2 Certificate, or Associate of Applied Science in HVAC Technology Degree as compared to the two nearest community colleges with similar programs. Unlike other colleges in the area which place instructors in classrooms and labs based solely on field experience, our program requires that all professors have earned a minimum of an AAS in HVAC in addition to significant, verifiable field experience.  The HVAC Program currently does not have a source of external accreditation. The HVAC Department has held several meetings and discussions comparing the two recognized external accreditation entities recognized by the industry. HVAC Excellence and Partnership for Air-Conditioning, Heating, Refrigeration Accreditation (PAHRA) are the two prominent options. Both require established lab facilities and budget history to meet initial qualifications. The Collin College HVAC Department will first meet those minimum time requirements upon completion of the 2022-23 academic year (third year). The team members are looking forward to the prospect of making that selection and moving forward with a formalized means of third party accreditation to add to its present collection of individual industry certifications.  The side by side comparison below clearly shows that our program matches very closely with the curricula of similar colleges while offering as many or more certificate options that can be earned by students, often in less time.  Going forward, we must be mindful that as new technologies continue to emerge and the need for an AAS, which is not currently an industry priority, becomes more desirable to hiring managers within the industry, we must examine the possibility of offering additional AAS pathways.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Collin College** 8 week format | |  | **North Central Texas College** 8 week format | |  | **Dallas College** 5 week and 8 week formats | | |  | |  |  |  |  |  |  |  |  |  |  | | **Certificate Level 1** 1 semester | | **credit hours** | **Basic Level 1 Certificate** 1 semester | | **credit hours** | **No Certificate offered** |  |  | **credit hours** | | **HVAC Entry Certification** |  |  |  |  |  |  |  |  |  | | Semester 1 | OE |  | Semester 1 | OE |  | Semester 1 - 5 week format |  | OE |  | | HART 1401 Basic Electricity for HVAC |  | 4 | HART 1301 Basic Electricity for HVAC |  | 3 | HART 1401 Basic Electricity for HVAC | |  | 4 | | Hart 1407 Refrigeration Principles |  | 4 | HART 1307 Refrigeration Principles |  | 3 | HART 1407 Refrigeration Principles | |  | 4 | | HART 1441 Residential AC |  | 4 | HART 1341 Residential AC |  | 3 | HART 1403 AC Control Principles | |  | 4 | | HART 1445 Gas and Electric Heat |  | 4 | HART 1356 EPA Certification Prep |  | 3 |  |  |  | **12** | |  |  | **16** | TECM 1301 Industrial Mathematics |  | 3 |  |  |  |  | |  |  |  |  |  | **15** |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | The following include all information above for each program | | |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | **Certificate Level 1**  2 semesters | |  | **Level 1 Certificate** 2 semesters | |  | **Level 1 Certificate 2 semesters** | |  |  | | **HVAC Residential Servicing Certification** |  |  |  |  |  | **Residential Technician** |  |  |  | | Semester 2 - 8 week format | OE |  | Semester 2 - 8 week format | OE |  | Semester 2 - 8 week format |  | OE |  | | HART 2431 Advanced Electricity for HVAC |  | 4 | HART 2345 Residential AC System Design | | 3 | HART 1441 Residential AC |  |  | 4 | | HART 2438 AC Installation and Startup |  | 4 | HART 2438 AC Installation and Startup | | 3 | HART 1445 Gas and Electric Heat | |  | 4 | | HART 2345 Residential AC System Design |  | 3 | HART 2342 Commercial Refrigeration |  | 3 | HART 2449 Heat Pumps |  |  | 4 | | HART 2349 Heat Pumps |  | 3 | HART 2349 Heat Pumps |  | 3 |  |  |  | **24** | |  |  | **30** | HART 2301 AC and Refrigeration Codes | | 3 |  |  |  |  | |  |  |  |  |  | **30** |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | The following include all information above for each program | | |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | **Certificate Level 2** 3 semesters | |  | **No Certificate offered** | N/A |  | **Level 2 Certificate** 3 semesters | |  |  | | Semester 3 - 8 week format | TSI Core |  | Semester 3 - 8 week format | TSI Core |  | **Residential Technician Level III** | |  |  | | **HVAC Commercial Servicing Certification** |  |  | OSHT 1320 Energy Industrial Safety |  | 3 | Requires the addition of two TSI core classes in Semester 1 | | | 6 | | HART 2341 Commercial AC |  | 3 | HART 2341 Commercial AC |  | 3 | Rrequires the addition of one TSI core class in Semester 2 | | | 3 | | HART 2342 Commercial Refrigeration |  | 3 | ELPT 2305 Motors and Transformers |  | 3 | Semester 3 - 8 week format |  |  |  | | SPCH 1321 or other TSI core Speech |  | 3 | ENGL 2311 Business and Technical Writing | | 3 | HART 2438 AC Installation and Startup | |  | 4 | | HART 2334 Advanced AC Controls |  | 3 | GOVT 2306 Texas Government - Core |  | 3 | HART 2436 AC Troubleshooting | |  | 4 | | HART 2343 Industrial AC |  | 3 |  |  | **45** | HART 2445 Residential AC System Design | |  | 4 | |  |  | **45** |  |  |  | TSI Core Math Elective |  |  | 3 | |  |  |  |  |  |  |  |  |  | **48** | | The following include all information above for each program | | |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | **AAS - HVAC** 4 semesters | |  | **AAS HVAC** 4 semesters | |  | **Commercial AC and Refrigeration AAS** | | 4 semesters |  | | Semester 4 - 8 week format | TSI Core |  | Semester 4 - 8 week format | TSI Core |  | Semester 4 - 8 week format |  | TSI Core |  | | ECON 1301 Intro to Economics or comparable | | 3 | HART 2334 Advanced AC Controls |  | 3 | HART 2368 Practicum or HART2380 Co-Op | |  | 3 | | ENGL 1301 Composition 1 |  | 3 | Math 1332 Contemporary Mathematics | | 3 | HART 1451 Energy Management | |  | 4 | | HART 2358 Test, Adjust, & Balancing HVAC | | 3 | SPCH 1311 Intro to Speech Communication | | 3 | HART 2334 Advanced AC Controls | |  | 3 | | GEN ED Humanities/Fine Arts |  | 3 | ARTS 1301 Art Appreciation |  | 3 | SPCH 1311 Intro to Speech Communication | |  | 3 | | GEN ED Math |  | 3 | HART 2380 Co-Op HVACR Technology |  | 3 | PSYC 2301 General Psychology | |  | 3 | |  |  | **60** |  |  | **60** |  |  |  | **60** | |  |  |  |  |  |  | **OR** |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  | **Residential AC and Refrigeration AAS** | | 4 semesters |  | |  |  |  |  |  |  | Semester 4 - 8 week format |  | TSI Core |  | |  |  |  |  |  |  | HART 2436 AC Troubleshooting | |  | 4 | |  |  |  |  |  |  | HART 1394 Special Topics in HVACR or HART 2380 | | | 3 | |  |  |  |  |  |  | PSYC 2301 General Psychology | |  | 3 | |  |  |  |  |  |  | Core Elective |  |  | 3 | |  |  |  |  |  |  | Core Elective |  |  | 3 | |  |  |  |  |  |  |  |  |  | **60** | |

**D. Present evidence from advisory committee minutes, attendance, and composition that the advisory committee includes employers who are actively engaged on the committee and who are representative of area employers.**

1. How many employers does your advisory committee have? 33

2. How many employers attended the last two meetings? 35

3. How has the advisory committee impacted the program over the last five years (including latest trends, directions, and insights into latest technologies)?

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| **1 How many employers does your advisory committee have?**  The advisory board average company attendees is 33.  The breakout:  2 Independent School Districts ·  31 Private Companies  The program at this point is 5 years old. The progress made in establishing a firm program has been made. In the last 2 and half years the air conditioning program has moved into a new building, written program specific labs, assembled donated equipment, along with setting and accomplishing interdepartmental goals. The advisory committee while small has contributed by providing donated equipment and program suggestions on a limited basis.  **2 How many employers attended the last two meetings?**  Thirty-Five employers attended spring 2022 meeting while 31 attended the Fall 2020 meeting.  · Nineteen members attended the Frisco Campus in the Fall of 2019 due to Covid. Advisory Committee minutes are provided in this program review submission  **3 How has the advisory committee impacted the program over the last five years?**  Reviewing of the minutes found a lack of input from our committee members. The HVAC faculty is addressing the issue and has come up with ideas to more involve the committee members :  · Introduce relevant topics for consideration during committee meetings and have those recorded in our minutes.  · Raise expectations for higher level interaction from members besides casual luncheon interaction  · Create “Break out groups” with assigned topics of discussion.  . Encourage company sponsoring of labs or classrooms with directives for focused interaction in related activities and covered topics.  · Help sponsor an HVAC club  · Sponsor-a-student- based on grades, achievement awards  · Bring meaningful discussion to each meeting for each member  · Involve members in specific lab development components. IE: Development of wiring training boards  · Sponsor a student rewards program. IE: Tool Giveaways to encourage graduation levels or specific training goals  · Make an Advisory Safety Committee  - Require Advisory Committee Members to participate as classroom speakers to develop relationships with the students  - Sponsor OSHA 10 or OSHA 30 fees for students  · Outreach to more military veterans during separation  · Solicit Advisory Committee members from Universities with mechanical degree programs that can turn college students toward HVAC Contracting .  · Develop scholarship support plan by committee members. IE: Create some type of competition within the advisory group.( Most donated, most active, golf outings.  . More personal interaction from Professors ie calls etc  .Send minutes of advisory board meeting to each member for review. |

4. Briefly summarize the curriculum recommendations made by the advisory committee over the last five years.

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| **4 Briefly summarize the curriculum recommendations made by the advisory committee over the last five years.**  A. Screening process for new students: Screening of new students should be done to facilitate a minimum level of competency. This recommendation also initially included criminal background checks (CBCs). The use of CBCs was removed immediately as being against our open enrollment initiatives.  B. Equipment needs: Evaluations of equipment needs before each academic year should be performed and presented to the Advisory Committee members for review. (Actively Initiated 2022)  C. Annually evaluate and formalize a degree plan that gives a student all the tools for a successful entry into the HVAC field. (Actively Initiated 2021)  D. Scholarships and grants for students: Explore all avenues of economic benefit for students maintaining a high performance level.  E Credentialing by Esco/HVAC Excellence. Our program needs recognition by educational or trade associations. This is one of the few means of third party accreditation available. Its applications, expenses, and return on investment are being evaluated.  F Introduction of latest technologies, specifically Variable Refrigerant Flow (VRF) systems. Keeping and maintaining current changes in technology  G Explore other grant opportunities for students. Explore and Research on a consistent basis other funding pathways for students  H CE education credit opportunities: Allow for local contractor educational opportunities for CE and New products on the market  I Stackable Certificates: For students to be successful and for the program to be meaningful we must see to it our students can complete the entire program instead of dropping out only completing a minimum of course work. At this time many students are not completing their Capstone tests and therefore forfeiting their certificates and Associates of Applied Science  J Co-Op and Apprenticeships: Learning while on the job is of great benfit as it helps to reinforce the classroom and lab learning.  K Adult learning grants: Financial assistance is always welcome for a student. Especially grants that support additional resources and learning objectives.  L Job placement: Job placement is great as it helps a student obtain meaningful employment in the chosen field. Our Career Coach  Is a great benefit for the school and student. |

**E**. **Make a case with evidence that the program is well managed.**

*Suggested/possible points to consider (Data can be found at* [**http://inside.collin.edu/institutionaleffect/Program\_Review\_Process.html**](http://inside.collin.edu/institutionaleffect/Program_Review_Process.html)**):**

* *Average class size*
* *Grade distributions*
* *Contact hours taught by full-time and part-time faculty*
* *Identify all courses that have a success rate below 75%. If any of these are core courses, visit with the discipline lead for the course(s) in question to determine whether or not the content of the course(s) is appropriate to the workforce program learning outcomes. Using assessment evidence and instructor observations, identify the student learning outcomes that are the greatest challenges for students in courses with low success rates. Explain what instructional and other intervention(s) might improve success rates for each identified course.*
* *How well are general education requirements integrated with the technical coursework?*
* *Student satisfaction: What evidence do you have that students are satisfied with the program? What kinds of complaints are made to the associate dean/director by program students?*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AVERAGE CLASS SIZE**  The average class size for the HVAC department is an easy report to follow. All HVAC classes, labs, and curriculum are designed to support a class of 16. Because of the natural average decrease of 2 students in the first semester, starting cohorts are set to enroll 18 students. Upon reaching the final semester of technical courses, cohort enrollment typically averages 10 students. Many students over the course of the degree plan find employment and would choose to begin their career as opposed to continuing on the AAS degree pathway. A low percentage do return in successive semesters. At this time the program is to young to establish a true figure of returning students. Students leaving the program for early employment is a reality of the HVAC field and other starved technical trades. Industries which do not yet recognize nor promote degrees to the level seen in other career fields remain a challenge to encourage students to complete the two year degree.  Since 2021 is the only year with all levels of courses containing student enrollment, this will be the sole year referenced for the following statistics. Adding all the students together, 364 total students, and dividing them by the total number of courses in 2021, 33 courses, makes for an average of 11 students per class. This is a good average for the program and shows that the program is well managed. By design, to avoid the high level of attrition due to early employment, dual cohorts are ran when enrollment permits and then cohorts are merged in the third semester to meet college class minimums. The merging of cohorts allows classes to maintain the 16 student target or, at bare minimum, the 11 student average shown above.    Source: <http://inside.collin.edu/iro/programreview/202122/AvgSectionSize-HVAC.pdf>  **GRADE DISTRIBUTIONS**  The grade distributions are as normal as can be expected with a program that has been growing, evolving, and adjusting for the last 5 years. The ratio of students who pass and continue on through the program vs those who fail out is higher at the beginning of the program. This is to be expected as some students, just like any program, discover they are not as suited for the field as they thought. In many cases, the students come to realize that their life can not sustain the added load of being a college student. This percentage in the first year, 2 semesters of classes, is 5.8%. Compare this higher percentage to what the average fail percentage is for the whole program of 3.6% which shows the courses have rigor but are not out of the students ability to successfully complete.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Course** | **A** | **B** | **C** | **D** | **F** | | **HART 1256 – EPA Recovery Cert Prep** | 58% | 22% | 7% | 2% | 9% | | **HART 1301 – Basic Electricity For HVAC** | 46% | 35% | 7% | 4% | 6% | | **HART 1307 – Refrigeration Principles** | 46% | 35% | 10% | 5% | 4% | | **HART 1441 – Residential Air Conditioning** | 55% | 28% | 6% | 4% | 6% | | **HART 1445 – Gas and Electric Heating** | 53% | 34% | 7% | 0% | 4% | | **HART 2334 – Advanced A-C Controls** | 42% | 32% | 26% | 0% | 0% | | **HART 2341 – Commercial Air Conditioning** | 67% | 17% | 17% | 0% | 0% | | **HART 2342 – Commercial Refrigeration** | 100% | 0% | 0% | 0% | 0% | | **HART 2343 – Industrial Air Conditioning** | 89% | 11% | 0% | 0% | 0% | | **HART 2345 – Residential AC System Design** | 33% | 44% | 14% | 4% | 4% | | **HART 2349 – Heat Pumps** | 43% | 34% | 11% | 7% | 5% | | **HART 2358 – Test Adjust Balancing HVAC Sys** | 30% | 39% | 17% | 4% | 9% | | **HART 2431 – Advanced Electricity for HVAC** | 52% | 31% | 12% | 3% | 1% | | **HART 2438 – AC Installation and Startup** | 35% | 40% | 19% | 1% | 3% |   Source: <http://inside.collin.edu/iro/programreview/202122/GradeDistribution-HVAC.pdf>  **FACULTY CONTACT HOURS**  Currently there are 5 full-time faculty and 16 part-time faculty in the HVAC program. The below table shows the contact hours taught by both full-time and part-time faculty. Over the last five years, full-time faculty taught an average of 33% of total course load while part-time faculty taught 66% of that. Comparing this to the other programs at Collin College it is clear that the HVAC program needs to be cleared to hire more full-time faculty. The needed shift, to maintain an organized program, of having more work performed by FT faculty vs. PT faculty is moving in a good direction, however. This is shown with the year 2021 being 47% full-time and 53% part-time. This number, 47% of teaching performed by full-time faculty is skewed however. The percentage would be considerably lower if it didn’t include all full time professors taking on overload courses as well as our director taking on additional classes due to the lack of qualified adjunct professors. It is clear the HVAC-R department needs to hire more full-time professors.    Source 2016: <http://inside.collin.edu/iro/programreview/2016_Fall_Contact_Hours.pdf>  Source 2017: <http://inside.collin.edu/iro/programreview/2017_Fall_Faculty_Contact_Hours.pdf>  Source 2018: <http://inside.collin.edu/iro/programreview/2018_Fall_Contact_Hours_Taught_by_FT-PT_Faculty.xlsx>  Source 2019: <http://inside.collin.edu/iro/programreview/201920/2019_Fall_Contact_Hours_Taught_by_FT-PT_Faculty.xlsx>  Source 2020: <http://inside.collin.edu/iro/programreview/2020_Fall_Faculty_Contact_Hours.xlsx>  Source 2021: <http://inside.collin.edu/iro/programreview/202122/202210%20Census%20Contact%20Hours%20Final.pdf>  **COURSES WITH SUCCESS RATES BELOW 75%**  The table below illustrates the average class success rates for all fourteen HVAC-R classes from 2017 to 2021. None of the classes show a success rate of below 75%. The overall average success rate of 93.8% does suggest a slight lack of academic rigor in the HVAC degree. The main cause of this is the newness of some of the classes as well as the high percentage of work completed by adjunct professors compared to full time professors. With more full time professors to hold more accountable to the operation of their class the program’s rigor and outcomes would improve. However, the 93.8% overall average is also slightly skewed by the incorrect representations of HART 2334, 2341, 2342, and 2343. College reporting shows a 100% completion rate for each of these classes. Department review of recorded and submitted student grades documents conflicting statistics. The issue with this number is that each of those classes is recorded as only being taught in 2021, when in fact they were taught in the earlier years as well, but as 4 credit hour courses which are not displayed or calculated in the college reporting statistics. Per example, Commercial Refrigeration, which was taught 3 times, has not had 100% success rates according to the Professor’s gradebooks. This shows that some of the college reporting methods are not fully conclusive and require departmental interpretation. The question of academic rigor in the HVAC-R program is being addressed by full-time staff with a plan to improve quizzes, tests, and labs to better challenge students.  Lastly implementation and support of the cohort initiative has proven to offer better overall success rates. When students register for HVAC courses they are enrolled into a cohort, or group of students that will stay together as they move through the program. Each class is designed to build int the next and as such serves as a prerequisite for the next level of classes. Therefore, if students have that added initiative to stay with their group of students; those who they are comfortable with, have worked with, and bonded with. Thiscreates and added incentive to work harder to succeed in the program.    Source for AY2017-2021: <http://inside.collin.edu/iro/programreview/202122/GradeDistribution-HVAC.pdf>  **GENERAL EDUCATION REQUIRMENTS**  The degree plan for the HVAC program is a staged offering of stackable certificates that finish with an AAS in HVAC. To promote the best collection of students to the program the general academic classes are not required for students to take until their last two semesters. As you can see from our degree plan shown below the students complete all HVAC courses and then they move on to complete their academic courses. This has many benefits. Those benefits include increased student retention, increased new student interest, and a higher turn over of students who enter the program receive their desired certificate level of training enabling earlier employment. The major con to this degree plan however is fewer graduates who complete with the AAS. The TSI test intimidates our students. To improve the number of students to receive the AAS, the program is working with a AEL (Adult Eduction and Literacy) grant to pre-test students and support students by preparing them for their academic classes. Additionally, the grant offers some additionional funding for selected course work.  The cohort initiative implemented by the HVAC program has been a great success. As shown by the degree plan below, each semester of classes is grouped together, each student must register for all 4 classes the entry semester then is highly encouraged to register in the four course blicks to accomplish their goals as an efficiaent pace. The students stay in this same cohort through the entirety of the degree plan if they pass all of their classes. This cohort of students continues on through the program together, promoting stronger relationships with fellow classmates and program professors, and maintain a better understanding of the staged curriculum. The other benefits of the cohort method is students are encouraged by fellow classmates to continue on through the AAS degree and to succeed in classes. The reason for this encouragement is if students fail a class they must wait until the next semester to retake it, loosing a whole semester of time and a loss of the cohort they have gotten familiar with. Therefore, there are strong consequences to students who choose to fail their classes but also very strong rewards to students who succeed in their classes and move forward through the degree plan. Beyond the classroom, the cohort initiative has also shown to greatly increase employment opportunities. Students that find satisfactory employment often confidently recommend their cohort members for employment within the same company based on their thre to four semesters of interaction in the classroom.      **STUDENT SATISFACTION**  The results for the student evaluation of instruction for the HVAC-R program is shown in the tables below for Fall 2020, Spring 2021, Fall 2021, and Spring 2022. The majority of students respond with “Strongly Agree” or “Agree” for all responses to the survey. This shows an overall positive response to the program, curriculum, and professors. However, there are students that “Disagree” and “Strongly Disagree” in each of those semesters as well. The average for each of the semesters is: Fall 2020 at 14%, Spring 2021 at 14%, Fall 2021 at 6%, Spring 2022 at 12% for an average of 11% overall. That means that 11% of students overall have been dissatisfied with the program or some of its courses. This has in large part been due to disorganization and lack of materials for student’s labs. The root of this issue was primarily caused by lacking a lab coordinator and lab assistant. Full time professors lack the training and the time to purchase, maintain, organize, construct, and inventory lab equipment and supplies. These issues have been greatly improved with the recent hire of David Hoffman as Lab Coordinator. However, the case is clear that the HVAC program needs to be supported, and a strong emphasis added, on hiring a lab assistant. This position would help in the maintenance of labs and lab equipment and would be available to support the evening classes. The position has been built and approved, but has been limited to “non-student” applicants with a level of credentialing that is not represented by the pay scale. Requests continue to raise the rate of pay commencerate to the expected level of experience and education required for that position.    The overall satisfaction of students seen in the survey’s 89% of students responding positively to the program and it’s professors, is also attributed to Director Sanders and Maddy Anderson for running the program. They have worked very hard to maintain program organization, enrollment, and student concerns. Director Sanders has made himself available to teach students, council them, and, in the rare case a student is an issue, supported professors in handling those problems. Maddy Anderson has been integral to Dir. Sanders coordination with the department and professors. She has aided in meetings, lab coordination, students schedules, and many other areas.    Source: <http://inside.collin.edu/iro/sei_reports/fall_2020/dept/Dept%20H-O.pdf>    Source: <http://inside.collin.edu/iro/sei_reports/spring_2021/departments/Dept%20F-L.pdf>    Source: <http://inside.collin.edu/iro/sei_reports/fall_2021/dept/HART-KINE.pdf>    Source: <http://inside.collin.edu/iro/sei_reports/spring_2022/dept/HART-KINE.pdf>  Upon inspecting the overall respondents to student satisfaction surveys one will see that the overall percentage of satisfied students isn’t increasing in the past years. This is a concern the department is paying attention to. As a department stagnation in student satisfaction is a concern. The concerns from students, mainly about differences in course curriculum and rigor, remains the same despite the efforts of the full time faculty to bring adjunct faculty up to equal levels of presentation. The next effort the full time faculty are going to make to improve overall satisfaction with students is standardized tests through the program. Inevitabley this will make some students frustrated with testing but overall we expect an increased effort from adjunct faculty to improve their course instruction. |

**6. How effectively do we communicate, and how do we know?**

**A. Make a case with evidence that the program literature and electronic sites are current, provide an accurate representation of the program, and support the program’s recruitment plan, retention plan and completion plan.**

*Suggested/possible points to consider:*

* *Demonstrate how the unit solicits student feedback regarding its website and literature and how it incorporates that feedback to make improvements.*
* *How does the program ensure that students are informed/aware of program literature? Is program literature made accessible to all students (i.e. can they obtain the information they need)?*
* *Designate who is responsible for monitoring and maintaining the unit’s website, and describe processes in place to ensure that information is current, accurate, relevant, and available.*

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| * At this time, we do not have a dedicated website for our department. There is a push for a new website platform and while we have asked for this to be established the response was to wait until the new site has been launched in Spring of 2023. We plan to have a departmental website as soon as we are able to launch with the Director, Program Coach, and Discipline Lead having access to make modifications. * The literature we have that we hand out at our registrations, orientations and during inquiries about our program include: FAQ sheet, degree plan and tool list. This literature is updated and checked over by our team, every semester before we hand them out. We have made changes to it over time to make sure that the information we hand out matches our syllabi and degree plan we offer. Our program information sheet is available online while we have a cohort specific handout for students to help them with their registration needs. This is not shared publicly but conveyed by the Career Coach and Director to support registration. * Our program information sheet can be found at the following link; <https://www.collin.edu/academics/info/hvacInfoSheet.pdf>. * Also, we have a program explanation page located on Collin College’s web page at the following link; <https://www.collin.edu/academics/programs/HVAC_1Overview.html>. |

**B. In the following Program Literature Review Table, document that the elements of information listed on the website and in brochures (current academic calendars, grading policies, course syllabi, program handouts, program tuition costs and additional fees, description of articulation agreements, availability of courses and awards, and local job demand in related fields) were verified for currency, accuracy, relevance, and are readily available to students and the public. Please fill out the table only for this prompt (B.), no analysis is necessary here.**

**Program Literature Review Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Type (i.e. URL, brochure, handout, etc.) | Date of Last Review/Update |  | Responsible Party |
| Tool List | Handout and Syllabus | 5/4/2022 | Current Accurate Relevant Available | Discipline Lead: Dennis Younkins Faculty, Steve Pierce, Cody Bagshaw, Houston Polasek also Director Brian Sanders |
| Cengage Course Outline2/24/2021 | Cengage Unlimeted Mind Tap | 2/24/2021 | Current Accurate Relevant Available | Discipline Lead Dennis Younkins Full Time Faculty Steve Pierce, Cody Bagshaw and Houston Polasek and Director Brian Sanders |
| Grading Rubrik | Collin College HVAC Concourse Syllabi | 1/1/2022 | Current Accurate Relevant Available | Discipline Lead Dennis Younkins Full Time Faculty Steve Pierce, Cody Bagshaw and Houston Polasek and Director Brian Sanders |
| Course Syllabi For all HVAC Classes | Collin College Concourse SYllabi | 1/1/2022 | Current Accurate Relevant Available | Discipline Lead Dennis Younkins Full Time Faculty Steve Pierce, Cody Bagshaw and Houston Polasek and Director Brian Sanders |
| FAQ Sheets | Hand Out To All Prospective Students and New Students during Enrollment. | 8/1/2022 | Current Accurate Relevant Available | Career Coach Sean Sweeden |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap to enter a date. | Current Accurate Relevant Available | Click or tap here to enter text. |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap to enter a date. | Current Accurate Relevant Available | Click or tap here to enter text. |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap to enter a date. | Current Accurate Relevant Available | Click or tap here to enter text. |
| Click or tap here to enter text. | Click or tap here to enter text. | Click or tap to enter a date. | Current Accurate Relevant Available | Click or tap here to enter text. |

**7. How well are we leveraging partnership resources and building relationships, and how do we know?**

**Partnership Resources: On the table below, list any business, industry, government, college, university, community, and/or consultant partnerships, including internal Collin departments, to advance the program outcomes.**

|  |
| --- |
| From the conception of creating the HVAC Program, many resources have pooled together to create what now exists. Starting with a handful of Advisory Committee members and Collin College Administration. This list has grown considerably, and continues to grow as momentum is found supporting the growth and vision of the HVAC Program.  At present, primary contributors are listed below. However, this is only a partial list when considering all of the local employers that have visited and offered small contributions that have added to the whole. Upon start-up of the HVAC Program, at its temporary facilities in Princeton ISDs CATE facility, Century A/C Supply was the first major supporter when it arrived one day with a generous gift of 12 complete air conditioning systems valued at over $30,000.00 to get the program started. Since that time, the HVAC Program has received multiple donations to equip its labs.  Most notably, during the overwhelming supply chain issues of the pandemic which aligned with the timing of the Technical Campus construction, large equipment donations were received from Intertek Inc., a national testing facility located in Plano. Without these donations (8 16-foot trailer loads) the HVAC labs would have opened the doors nearly barren. Although this donated equipment required creative applications at times, it allowed the program to functionally open on time. Trane Corporation followed quickly with 8 residential cooling systems and 8 roof top air conditioning units to equip the Commercial A/C Lab. ACIS has since helped the HVAC Department locate used industrial cooling equipment, and Crocket Cranes donated its services to overcome a large physical hurdle in the placement of the 180-ton Carrier Industrial Chiller.  Curriculum guidance and selection came from multiple directions and sources. Tarrant County Community College participated in guidance of the very early concepts for the HVAC Program. TCCC has since proven to be a good friend and mentor as the program continued to build. Offering to share industry contacts, curriculum selection and even to allow the college to measure and mimic the construction of their own facilities. Dallas Community College has also assisted on several occasions to share its experiences, curriculum, and industry contacts.  With growth and maturity occurring on a steep learning curve, the HVAC Program quickly needed a dedicated person to focus on partnerships in the form of employment opportunities for our students. The hiring of a full-time Career Coach has proven to be an unimagined level of support to the program. Career Coach Sean Sweeden keeps a constant contact with local Economic Development Committees, Veteran affiliations, over 60 regular employers, Texas Workforce Commission, all Collin County ISDs, along with statewide affiliations offering larger regional contacts for industry partners. Collin College’s application of Career Coaches has been a recognized effort to support the Workforce Programs that few other colleges can match.  One recent marker of our success has come in the request to host the annual meeting for the Texas Air Conditioning Contractors Association (TACCA). This is the state chapter of the national Air Conditioning Contractors Association (ACCA). In Fall of 2021, when the HVAC Program had only been in its permanent facility for 12 months, we were toured by a statewide committee composed of representatives from Texas and the Washington D.C national chapter of the ACCA. Recognizing that our campus had only recently opened, expectations were low, but statewide discussions had impressed the committee with the dedication given by Collin College to establish a well-planned and well-funded technical campus. So our Technical Campus was added as a last short stop before boarding planes at DFW. The parting comment from the committee members… “We should have started here!”  The HVAC Department continues to welcome all interested parties to support and interact with our program. Diversity, open minded thinking, and support from industry continue to guide our pathways. The confirmation of continuing to apply proper efforts to the functioning of the HVAC Program are seen in the expanding level of support from our national and regional stakeholders as well as the employment and eventual success of our students. |

**Partnership Resources Table\*\***

|  |  |  |  |
| --- | --- | --- | --- |
| Partner/Organization | Description | Formal Agreement Duration,  if any. | How is it Valuable to the Program? |
| Tarrant County Community College: Dept. of HVAC Technology | Regional established HVAC Program | N/A | Provides ongoing consultation, guidance, and support through industry contacts and experiences. |
| Dallas Communtity College: Dept. of HVAC | Regioanl established HVAC Program | N/A | Provides ongoing consultation, guidance, and support through industry contacts and experiences. |
| Hampden Engineering | National producer of commercially produced trainers | N/A | Provides industry contacts and educational contacts for support and guidance. |
| Advanced Technologies Consultants | National producer of commercially produced trainers | N/A | Provides industry contacts and educational contacts for support and guidance. |
| Tech-Labs | National producer of commercially produced trainers | N/A | Provides industry contacts and educational contacts for support and guidance. |
| ESCO Group Inc. | National supporter of HVAC educators. | N/A | Program specific professional development, potential national accreditation provider, annual conferences, EPA 608 Proctor Certifications, HVAC Teacher Certifications, Provides Industry Contacts, Resource for HVAC specific scholarships. |
| Trane Corporation | International provider of HVAC Equipment | N/A | Provides learning resources, guidance, consultation, scholarships, and training equipment. |
| Lennox Corporation | International provider of HVAC Equipment | N/A | Provides learning resources, guidance, consultation, and training equipment |
| American Heating and Refrigeration Institute (AHRI)  A#1 Air  ABC Pest and Home Serivces  Century A/C Supply  Intertek Inc. | Natioanl coalition of equipment manufacturers.  Regional Air Conditioning Company  Regional Air Conditioning Company  Regional Air Conditioning Equipment Supply Warehouse  National equipment testing facilities | N/A  N/A  N/A  N/A  N/A | Provided donated training equipment  Provided donated training equipment  Provided donated training equipment  Provided donated training equipment  Provided donated training equipment |

**8. What professional developmental opportunities add value to your program?**

|  |
| --- |
| **To date, the most recognized and utilized form of outside professional development available to the HVAC educators is the ESCO; HVAC Excellence National HVAC Educators’ Conference. With the growing support of the trades and formal education, more conferences and trainings are starting to be offered by suppliers and manufacturers to workforce educators. The HVAC Department faculty continue to search for opportunities of value to their classroom applications. Conventional academic training remains a constant through the college and is heavily utilized.** |

**Provide a List of professional development activities employees have participated in since the last program review.**

**Employee Resources Table\*\***

|  |  |  |  |
| --- | --- | --- | --- |
| Employee Name | Role in Unit | Professional Development Summary | How is it Valuable to the Unit? |
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| Steve Pierce | Full Time Professor Of HVAC Technology | 1. AAS of HVAC Collin College 5/19  2. Wright Soft Software Training 12/20 Zoom Meeting  3. Cengage Mind Tap Training with Kelly Kirby 1/21 Zoom Meeting  4.Attended Propane Education & Research Council Train the Trainer July 2022 Tampa, Florida | 1. The AAS in HVAC gave me a better understanding of the theory’s and formulas that it takes to understand how HVAC systems operate. The Degree also helped me better study the material and present it to the students desiring to go work in the HVAC Industry.  2. We received training on the Wright Soft software and how-to breakdown and present the material that we purchased to use in the residential Design Class over the eight-week period.  3. We used this opportunity to learn from employees of Cengage how to set up course material and integrate it into our Canvas Shell.  4.Attended Propane Education & Research Council Train the Trainer July 2022 Tampa, Florida |
| Dennis Younkins | Full-Time HART Professor (2020-present)  Teaches all cources that are offered in the HART Program. | 1 ESCO Institute approved Proctor. 2020  2 Heating, Ventilation, Air Conditioning Excellence: Certified Air Conditioning Educator. 2021  3 Heating, Ventilation, Air Conditioning Excellence: Effective Teaching Methodologies. 2021  4 Heating, Ventilation, Air Conditioning Excellance: New to Teaching. 2021  5 Heating, Ventilation, Air Conditioning Excellence: Planning for Success in the Classroom. 2021  6 Heating, Ventilation, Air Conditioning Excellence: Teaching Don’ts. 2021  7 Heating, Ventilation, Air Conditiong Excellence: Hands-On Projects for the Classroom. 2022  8 Heating, Ventilation, Air Conitioning Excellence: Incorporating Digital Content into Your Training. 2022  9 Collin College’s Leading for Excellence Academy: Conflict and Difficult Conversations. 2022  10 Collin College’s Leading for Excellence Academy: Nuts and Bolts of Daily Business. 2022 | 1 Becoming an approved proctor helps the program with giving federal exams to the program’s students.  2-8 Have been general teaching classes to improve teaching ability that were shared with the department as a whole.  9-10 Are professional development classes that have been useful in the daily operations/communications of the HART department. |
| Cody Bagshaw | 2020: Adjunct HVAC Professor  2021-Present: FT HVAC Professor | 2020: Worked in the HVAC-R Industry as a technician while teaching part time at Collin College. Attended Faculty Development Day and all New Faculty Academy Training Zoom meetings.  2021: HVACR Learning Network Provided by ESCO and RSES online training  2022: HVACR Excellence Conference in person in Las Vegas | 2020: Working in the field as a technician helped me gain more hands-on experience to be able to accurately teach students what to expect and how the real world works. Faculty Development Day taught many useful skills about how to be an effective professor. These skills added to my previous teaching experience.  New Faculty Academy Training taught me how to better work with-in Collin College as an organization.  2021: This was an all online training for HVACR technicians and teachers. It covered many topics but the ones I focused on was how to be a better professor and teacher to rising technicians.  I also took courses on latest industry advancements such as ECM motors and PE charts.  2022: This was three days full of information. To give a brief summary of the many topics I learned about at this conference here is list: Demystifiying parallel refrigeration rack systems, Psychrometrics without tears, Teaching three types of students, PE charts without tears, When did motors get so complicated?, Quickening the learning curve, Bringing the basics to life. |
| Mike Brucia | Full-time Professor, HVAC Technology | 1 Keeping Students Engaged in Online Classes – 2018  2 Lennox Load-Calc training  3 HVACR Excellence Conference – 2019  4 ESCO Institute Proctor – 2019  5 HVAC Excellence Online Conference – 2020  6 Mini-Split Systems Instructor Certification – Fujitsu America, 2020  7 AAS HVAC and Refrigeration Technology, North Central Texas College - 2021  8 HVAC Excellence Online Conference - 2021  9 HVACR Excellence Conference Live – 2019  10 Propane Research and Education Council Train the Trainer | 1 Increased my awareness of techniques to fully engage with students in various ways via the Canvas LMS.  2 Training in the use of the newly developed load calculation software Lennox Load-Calc. Increasing my knowledge on this industry essential subject and enabling me to empower students to learn about this new technology  3 A national conference dedicated to improving the skills and knowledge of post-secondary HVACR instructors. I participated in 20 hours of in-person CE training courses led by industry experts. I returned to my campus a more knowledgeable instructor and was able to share the insights I gained with HVAC faculty peers and to provide purchasing recommendations for new training equipment and materials.  4 Upon completion of the training I was able to bring the latest technology and teaching techniques back to my campus to share with HVAC faculty peers. After implementing the new ESCO program, student success increased dramatically and has continued to improve as our ability to administer the training improved.  5 Participated in interactive webinar trainings on a wide variety of HVACR subjects to increase my knowledge and ability to effectively share that knowledge with students and was able to share those insights with peer HVACR faculty.  6 Attended a 12-hour training program dedicated to installation, service and repair of Fujitsu Mini-Split Technology and how to teach the technology to better prepare our students to enter an ever-changing industry.  7 Degreed faculty provides an increased level of credibility for the program. Additionally this helps to inspire students to learn and to puruse a degree for themselves.  8 Annual continuation of training with industry experts on HVAC and refrigeration technology and pedagogy to share with faculty peers to improve the quality of instruction.  9 Focused training on the current and pending changes in refrigerants as the industry moves into A2L semi-flammable and HC Hydrocarbon flammable refrigerants in order to prepare faculty to implement best practices for a safe transition to these new products in our Labs and to develop training to prepare students for this new environment.  10 Certification in the industry specific installation and testing of propane HVAC and associated plumbing in order to provide the most current training to students  ck or tap here to enter text. |
| Houston Polasek | Full Time HVAC Professor | 1. Esco Proctor 2021 | Provide proctoring for the Required Federal exam - EPA Certification for HVAC students |
|  |  | 2. Esco The Abc of Building Autmation Systems 2021 |  |
|  |  | 3 Esco Daikin One+installation  2021 |  |
| Houston Polasek ( con’t) |  | 4 Esco Covid and Air Treatment 2021 | 1 Esco Procter helps to get students EPA Certified |
|  |  | 5 Certified Master Chat (CMHE) 2021 | 2-9 Esco training helps the program by expanding knowlenge of HVAC |
|  |  | 6 Transitioning from cooling to Refrigeraton ( not Easy) 2021 | 10 and 11 helps the program as I am a licensed contractor and was required by Collin College. |
|  |  | 7 Proper use of test equipment 2021 |  |
|  |  | 8 Remote training ( virtual Classroom 2021 |  |
|  |  | 9 System Trouble shooter Better and faster2021 |  |
|  |  | 10 ACCA Building Science and Code 2021 |  |
|  |  | 11 ACCA Manual J outcomes Humidity Management |  |
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\*\*For convenience, if providing a listing of professional development activities, this list may be included in this document as an appendix.

**9. Are facilities, equipment, and funding sufficient to support the program? If not, please explain.**

**[OPTIONAL—Only respond to prompt 9 if you are requesting improved resources for your program. If current facilities and budget are adequate, please proceed to prompt 10.]**

**Make a case with evidence that current deficiencies or potential deficiencies related to facilities, equipment, maintenance, replacement, plans, or budgets pose important barriers to the program or student success.** As part of your response, complete the resource tables, below, to supportyour narrative.

*Possible points to consider:*

* *The useful life of structure, technologies and equipment*
* *Special structural requirements*
* *Anticipated technology changes impacting equipment sooner than usual*

|  |
| --- |
| **The HVAC Program has occupied its permanent facilities since August of 2020. The doors opened with less than 40% of its lab equipment received and installed due to supply chain issues caused by the pandemic. This presented numerous challenges in the first three semesters while back ordered equipment and closed funding from the construction phase of the Technical Campus had to be offset with the use of the HVAC Department’s consumables and operational budget. Two years of slow integration and installation has evolved to a fully outfitted set of labs.**    **The present HVAC budget should prove to be adequate for the regular operation of the HVAC program at present enrollment and present industry costs for consumables. The concern is with the replacement of the operational lab equipment. The present budget was not built to cover the large expense of replacing the primary lab equipment in five of the seven labs. This equipment is standard residential and/or commercial cooling and heating equipment that is designed to be serviced annually and installed but once in its 15 year projected lifespan. Due to the nature of the program, the added factor of being done by technicians in training, and the large number of HVAC program participants, most equipment sees a lifetime of service in a single semester. Installation of such equipment is accomplished up to four times per semester by the multiple cohorts that utilize the same lab at different times of the day. The wear and tear of assembly, disassembly, operations of recovery and evacuation, and even the simple removal of mounting screws all wear out this mainstream heating and cooling equipment at an expedited rate.**  **In practicality, equipment used for installation instruction for a trade program such as the Collin College HVAC Program needs to be replaced on a rotating three year replacement plan. Meaning that a third of the labs need to have the serviced equipment replaced each year. A break down of more specific application and the associated costs are located on the chart to follow.**  **The funding for upper level commercially produced trainers has so far been adequately supplied by grants. These commercially produced trainers are used for troubleshooting and analysis only. They are built to mimic the actual equipment, but fail to give the full hands-on training needed to produce an employable student. Grant funding for such commercially produced trainers is greatly appreciated, however, few grants will cover the purchase of what is needed for the bulk of the hands-on training offered by the HVAC Program. A means of planning a replacement schedule and funding for those needed replacements is quickly becoming a focus as the HVAC labs approach their third year of utilization. Experience shared by others colleges with established HVAC programs shows that 3 years is the typical utilization period for residential and commercial air conditioning equipment when used as a training piece for trade school applications. Since this 3 year period typically is shorter than the change in the technology behind residential/commercial air conditioning equipment, it fortunately removes the concern and necessity to change out equipment based solely on changes in technology.**  **Equipment applied to the training of system installation is able to be utilized for a maximum of two semesters before starting to lose function. HVAC Professors have arrived at multiple aftermarket applications to extend the useful life of the Installation Lab equipment, but by year two it is rare to have surviving training equipment. A donation from Trane Industries assisted in extending our lab’s functionality, but such large donations are not to be expected on a regular basis. A planned budget pathway is needed to avoid lost learning potential when equipment is no longer functional for professional training applications.**  **At present, the Residential Cooling Lab and the Installation Lab have seen the heaviest utilization, reached the end of their “Service Life” and are marked for first replacement. Funding is being sought, but long term an “Equipment Replacement Plan” must be initialized, formalized and funded to maintain the expected outcomes of the HVAC Program. Administration is reviewing and planning to actuate such plans for most of the Technical Campus programs as this is a shared concern.**  **A final but less challenging budget item for upcoming years is the need for funding of third party accreditation. HVAC Excellence accreditation requires an intial investment of $10,000.00 and semi-annual reviews costing $3,500.00 moving forward.PAHRA accreditation is less expensive with an intial cost of $3,500.00 and annual renewals of $1,800.00. A line item suggestion of $2,000.00 per year is being suggested as a reasonable average until a final selection is made as to which accreditation supplier will offer the greatest end value to the HVAC Program.** |

**Facilities Resources Table\*\***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Significant Pieces of Equipment | Description  (i.e. Special Characteristics) | Meets Needs (Y or N):  Current For Next 5 Years | | Analysis of Equipment Utilization |
| Residential Cooling Lab | 8 matching residential cooling systems utilized for troubleshooting and system performance analysis. | Yes | No | Residential cooling equipment is designed to be inspected annually for a 15 year life span when installed for a homeowner. When utilized in a training lab, this equipment is opened, disassembled, parts removed and replaced on an average of two to four times per course, per week. Averaging 32 services per semester. This is the equivalent to 30 years of access and service per semester in comparison to an actual residential installation. With special note that this is all accomplished by an inexperienced technician in training. |
| Residential Gas Heating Lab | 8 matching residential gas furnaces utilized for troubleshooting and system performance analysis. | Yes | No | Same utilization scenario as Residential Cooling Lab systems |
| Installation Lab | 8 matching residential heating and cooling systems utilized for installation, set up, and start up procedures to duplicate the same for a complete residential heating and cooling system. | Yes | No | Any residential or commercial heating and cooling system is expected to endure a single installation in a 15 year service time. Each system at the college is installed three to four times per semester, up to 8 times per academic year, and 24 times in a three year life span as a piece of training equipment. Mechanical connections, brazed copper, electrical connections, and all similar installation processes are not part of the design of actual operating heating and cooling systems. Equipment for the Installation Lab has a maximum utilization of one (1) academic year. Customization throught the ingenuity of our professors has extended that usefulness to two (2) academic years before functionality starts to diminish significantly. |
| Heat Pump Lab | 8 matching inside and outside heating/cooling systems. These 8 units are utilized for a higher caliber of installation, trouble shooting, parts replacement, and system efficiency analysis than the other labs. | Yes | No | Although handled by second semester students, the simple wear and tear of daily opening of housings, parts removal and replacement, along with the occasional mishap by a student lend this equipment to a three year rotation similar to the other residential lab applications. |
| Commercial Air Conditioning Lab | 8 matching commercial roof top units utilized similar to the Heat Pump Lab systems. | Yes | No | Due to the lower number of students participating in third semester course work, this equipment is expected to be functioning adequately for up to four years. With fewer components and not being utilized for the more destructive tasks, this slightly longer application and utilization is very feasible. |
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**Equipment/Technology Table ($5,000 or more) \*\***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Current Equipment Item or Budget Amount | Description | Meets Needs (Y or N):  Current For Next 5 Years | | For any “N”, justify needed equipment or budget change |
| $29,500.00 (Trane Quote) | Residential Cooling Lab: 8 Residential cooling systems | Yes | No | Budget adjustments needed to provide planned replacement of highly utilized training equipment. |
| $25,500.00 (Trane Quote) | Residential Gas Heating Lab: 8 90% AFUE Gas Furnaces | Yes | No | Budget adjustments needed to provide planned replacement of highly utilized training equipment. |
| $25,800.00 (Trane Quote) | A/C Installation Lab: 8 Residential heating & cooling systems | Yes | No | Budget adjustments needed to provide planned replacement of highly utilized training equipment. |
| $35,200.00 (Trane Quote) | Heat Pump Lab: 8 Residential heat pump systems | Yes | No | Budget adjustments needed to provide planned replacement of highly utilized training equipment. |
| $58,500.00 (estimated) | Commercial A/C Lab: 8 Commercial roof top units | Yes | No | Budget adjustments needed to provide planned replacement of highly utilized training equipment. |
| $58,200.00 (Budget Line Item) | Three year averaged line item for lab equipment “Planned Equipment Replacement” needs. | No | No | Budget adjustment to cover average annual “Planned Equipment Replacement” for lab equipment listed above. |
| $2,000.00 (Budget Line Item) | Third Party Accreditation | No | No | Budget adjustment to cover average annual maintenance of third party accreditation. |
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**Financial Resources Table\*\***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source of Funds (i.e. college budget, grant, etc.) | Meets Needs (Y or N):  Current For Next 5 Years | | For any “N”, explain why | For any “N”, identify expected source of additional funds if needed |
| HVAC Program Operational Budget | Yes | No | Program budget was designed to meet standard operational costs. It does not include funding for the planned replacement of the actual training equipment. | Seeking separate budget line from college for “Planned Equipment Replacement”. |
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Section III.Continuous Improvement Plan (CIP)

**10. How have past Continuous Improvement Plans contributed to success?**

Program Review at Collin College takes place for each unit or program every five years. During the last (fifth) year, the program evaluates the data collected during the CIP process.

**Please describe how you have used your Continuous Improvement Plan (CIP) to make the following improvements to your program over the past 4 years (your last program review can be found on the Program Review Portal):**

* 1. **Program Learning Outcomes/Program Competencies**
  2. **Overall improvements to your program**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| The Heating, Air Conditioning, and Refrigeration Technology (HART) program utilizes the Continuous Improvement Plan as a methodology to identify important learning outcomes in the curriculum to ensure students are learning certain foundational concepts. In the first and second year of the program review two outcomes were identified:   1. Upon finishing HART-1307 students should be able to do the following: Describe the basic vapor compression cycle and how the first and second law of thermodynamics apply (student learning outcome 2.0). 2. Another area of focus that was identified in HART-1307 was the understanding of superheated gases and subcooled liquids. On class completions students should be able to do the following: Describe how to calculate the measured amount of a superheated gas; Describe how calculate the measured amount of a subcooled liquid (student learning outcome 3.0).   It appears that possibly two other CIPs were added. The assumption is that these goals were meant for year 3 and year 4 of the CIP process.   1. A professional development enhancement was added and applied to all full-time faculty. The enhancement goal was that 100% of the faculty added a third-party industry certification to their resume. 2. Upon finishing HART-2345 a student professionalism goal was applied to the class’s final presentation project. The expectation was 75% of the students would earn a 75% or higher on the class presentation project.   Now in year 5, the department’s first program review is concluding. The program initially begun at temporary facilities located at Princeton ISD’s CATE center, with evening classes, in 2018. The program transferred to the new Allen Technical Campus during the fall of 2020 during the pandemic. Along with the normal challenges of a program in its infancy, many unanticipated issues were realized with the pandemic. With the exception of the program’s original sole full-time professor, Brian Sanders, all of the additional five full time professors are new to the teaching profession. Moving forward the department will be implementing processes to better handle Collin College’s continuous improvement plans with a more uniform application for both adjunct and full time employees. As well, with knowledge developed in conducting the present program review future review processes will be better understood and prepared for.  **Outcome #1**  For years 2018 and 2019, general work sheets have been used along with the previous and current text book to reinforce the understanding of the refrigeration cycle for HART-1307. The Department’s initial goal of 80% of the program’s students earning 75% or higher on the departmental exam was inconclusive due to lack of uniform application between full time and adjunct professors. Moving forward the department will develop a departmental work sheet that will be used in all HART-1407 classes. This uniformity will help ensure future students will have a better understanding of the refrigeration cycle by the time completion.  **Outcome #2**  The second outcomes for 2018 and 2019 are very similar for outcome #1. General worksheets, textbooks readings, and labs were preformed help meet the Department’s goals of 80% of enrollment earning 75% or higher on the departmental exam. Based on exams scores this goal was met, but lacked the level of definition to truly support a means of advancement. Again, moving forward the department will develop a departmental work sheet and labs that will be used in all HART-1407 classes. This uniformity will help ensure future students will meet this basic understanding of calculating superheated gases and subcooled liquids.    **Outcome #3**  It is unclear if a second continuous improvement plan was implemented. The department may have submitted two sperate CIP forms, but both are dated for 2018. The second form may have been meant for the 2020 CIP year which fell into the pandemic and transferring of the program to the new facilities and new degree plan. The third additional expected outcome was for the professional development enhancement for the faculty. The goal of 100% of the faculty earning an industry third party certification was met.  **Outcome #4**  The final expected outcome was focused on HART-2345’s final presentation scores. The goal was for 75% of students enrolled to earn 75% or higher on the presentation. The actual percentage was 64% of students earned about 75% or higher on their final presentation. The missed goal for this expected outcome was due to the lack of preparation on the students part and the need to better prepare our students’ for this assignment.  **Continuous Improvement Plan**  **Outcomes might not change from year to year. For example, if you have not met previous targets, you may wish to retain the same outcomes. *If this is an academic, workforce, or continuing education program, you must have at least one student learning outcome.* You may also add short-term administrative, technological, assessment, resource or professional development goals, as needed.**  **Date:** March 30th 2018 **Name of Program/Unit: HVAC**  **Contact name:** Brian G. Sanders **Contact email:** Bsanders@collin.edu **Contact phone:**  469-365-1832  **Table 1: CIP Outcomes, Measures & Targets Table (focus on at least one for the next two years)**   |  |  |  | | --- | --- | --- | | **A. Expected Outcome(s)**  Results expected in this unit  (e.g. Authorization requests will be completed more quickly; Increase client satisfaction with our services) | **B. Measure(s)**  Instrument(s)/process(es) used to measure results  (e.g. survey results, exam questions, etc.) | **C. Target(s)**  Level of success expected  (e.g. 80% approval rating, 10 day faster request turn-around time, etc.) | | Increase in student understanding of basic refrigeration cycle.  (HART 1307 SLO 2.0) | Departmental Refrigeration Cycle Worksheet | Target of 80% earning a 75% or better completion of departmental exam. | | Increase in student understanding of superheat and sub-cooling  (HART 1307 SLO 3.0) | Departmental Superheat/Sub-cooling Worksheet | Target of 80% earning a 75% or better completion of departmental exam. | | Professional Development enhancement | 3rd Party Industry Certification | 100% of all Full-time Professors will add at least one industry certification to their resume | | Increase level of student professionalism  (PLO #7) | HART 2345 Final Presentation | Target of 75% of students earning a 75% or higher on the final presentation. |   **Description of Fields in the Following CIP Tables:**  **A. Outcome(s)** -Results expected in this program (e.g. Students will learn how to compare/contrast conflict and structural functional theories; increase student retention in Nursing Program).  **B. Measure(s)** -Instrument(s)/process(es) used to measure results  (e.g. results of surveys, test item questions 6 & 7 from final exam, end of term retention rates, etc.)  **C. Target(s)** -Degree of success expected (e.g. 80% approval rating, 25 graduates per year, increase retention by 2% etc.).  **D. Action Plan** -Based on analysis, identify actions to be taken to accomplish outcome. What will you do?  **E. Results Summary** - Summarize the information and data collected in year 1.  **F. Findings** - Explain how the information and data has impacted the expected outcome and program success.  **G. Implementation of Findings** – Describe how you have used or will use your findings and analysis of the data to make improvements.  **Table 2. CIP Outcomes 1 & 2 (FOCUS ON AT LEAST 1)**   |  |  | | --- | --- | | 1. **Outcome #1**   Increase in student understanding of basic refrigeration cycle.  (HART 1307 SLO 2.0) | | | 1. **Measure (Outcome #1)**   Complete departmental examination worksheet (2.0) for refrigeration cycle | 1. **Target (Outcome #1)**   Target of 80% earning a 75% or better completion of departmental exam. | | 1. **Action Plan (Outcome #1)**   Administer departmental examination worksheet (2.0) as part of final exam for all Spring 2019 sections of HART 1307 | | | 1. **Results Summary (Outcome #1)**   85% of students earned a 75% or higher completion of examination over refrigeration cycle. | | | 1. **Findings (Outcome #1)**   Focus on teaching of refrigeration cycle and uniformity of department created a better learning experience for students. | | | 1. **Implementation of Findings**   Department will continue to implement greater uniformity in all of its teaching applications. Greater focus needed on SLO applications. | |  |  |  | | --- | --- | | 1. **Outcome #2**   Increase in student understanding of superheat and sub-cooling  (HART 1307 SLO 3.0) | | | 1. **Measure (Outcome #2)**   Complete departmental examination worksheet (2.0) for calculating superheat and sub-cooling | 1. **Target (Outcome #2)**   Target of 80% earning a 75% or better completion of departmental exam. | | 1. **Action Plan (Outcome #2)**   Administer departmental examination worksheet (2.0) as part of final exam for all Spring 2019 sections of HART 1307 | | | 1. **Results Summary (Outcome #2)**   76% of students earned a 75% or higher completion of the departmental worksheet on sub-cooling and superheat. | | | 1. **Findings (Outcome #2)**   Found students continued to exhibit confusion on terminology and application of worksheet. | | | 1. **Implementation of Findings**   Department will continue to build uniformity and focus on teaching of SLOs. Worksheet will be revised again, and practice applications will be utilized earlier in semester to avoid confusion during final exam. | | |

**\*Please attach previous CIP Tables in the appendix**

**11. How will we evaluate our success?**

**NOTE: Please contact the institutional effectiveness office if you need assistance filling out the CIP tables.**

As part of the fifth year Program Review, the program should use the observations and data generated by this process along with data from other relevant assessment activities to develop the program’s CIP and an action plan for the next two years. At the conclusion of the first two years, data collected from the first year, plus any other relevant data that was collected in the interim, should be used to build on the accomplishments of those first two years by developing another two-year action plan for the CIP to help the program accomplish the expected outcomes established in its CIP or by implementing one of your other plans.

**Based on the information, analysis, and discussion that have been presented up to this point, summarize the strengths and weaknesses of this program. There should be no surprise issues here! This response should be based on information from prior sections of this document. Describe specific actions the faculty intends to take to capitalize on the strengths, mitigate the weaknesses, improve student success and program learning outcomes.** **Provide the rationale for the expected outcomes chosen for the CIP(s).**

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| The first program review process has provided insight into the strengths and weaknesses of Collin’s HART program.  **STRENGTHS**  Industry partnerships we have made since the new campus opened have hired our students and alumni. The department’s career coach receives requests from employers on frequent basis about job postings they would like filled with our students and alumni. Many current students and graduates are in entry to mid-level positions. We are also starting to see our industry partners sending their current employees to further their staff’s education.  Many HART students work full or part-time, and providing a hybrid platform allows students to continue working while progressing in their education. This hybrid structure allows students to complete many of their assignments online. The online environment requires students to become proficient with technology, a crucial skill for any future HVAC/R professional.  The program has set the bar high for involved faculty and leadership to stay involved with the industry. The current program director, Brian Sanders has over twenty years in teaching HART programs at various schools. Under his vision of curriculum uniformity the progam continues to progress year after year.  **WEAKNESSES**  In order to graduate more HVAC/R professionals with an AAS degree there is a need for industry to place more of an emphasis on degree completion. Presently, most employers are requiring only an entry level certificate and EPA certification for employment. This has a direct effect on students continuing their education and completing an AAS degree.  Final exam success rates in all courses are not at an acceptable level. A draw back of the hybrid model is that it promotes a heavy dependence on the internet, and students are not using program’s text book as the main source of information. The program’s success rate is very high and it is directly related the scores that are earned on online portion of the course. The program director with faculty are working to address this issue of academic rigor. One of the program’s new CIPs will be implemented next year to help address internet dependence issue. As a result the faculty hope to see an improvement in final exam grades for all incoming cohorts.  Finally moving forward with a better understanding of the program review and CIP process the department’s faculty will be better prepared for implementing changes to improve the Collin’s HVAC program. The key will be to identify major issues, implementataion of changes, and tracking outcomes to determine positive or negative effects of those changes. Currently with Collin’s HVAC program going into its third year, at the new campus, multiple issues will need to placed on the next CIP. |

**12. Complete the Continuous Improvement Plan (CIP) tables that follow.**

Within the context of the information gleaned in this review process and any other relevant data, identify program priorities for the next two years, **including at least one program learning outcome (or program competency)**, and focus on these priorities to formulate your CIP. You may also add short-term administrative, technological, assessment, resource or professional development outcomes as needed.

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| Through the program review process, we have determined that there is a need for significant improvement in two specific areas. Accordingly, we have selected CIP objectives on which to focus for the next two-year cycle.  CIP Objective #1:  Increase academic rigor. We have identified a trend within the academic coursework throughout the hybrid courses in the program. Students do exceptionally well on all academic assignments. However, scores on proctored exams indicate that students are not retaining the concepts and theory they are expected to have learned. We will reduce student reliance on internet searches. We will introduce weekly proctored tests and increase weighting of mid-term exams.  CIP Objective #2:  Increase diversity. As noted in this report, nationally the HVACR industry predominantly consists of white males. Our enrollment reflects that our program has a larger percentage of minority males than the industry, but virtually no female students. Consequently, diversity in the HVAC program does not match that of Collin College. Going forward, our recruiting efforts will be directed toward individuals who are currently underrepresents in the industry and our program. |

**Table 1. CIP Outcomes, Measures & Targets Table (focus on at least one for the next two years)**

|  |  |  |
| --- | --- | --- |
| **A. Expected Outcomes**  Results expected in this unit  (e.g. Authorization requests will be completed more quickly; Increase client satisfaction with our services) | **B. Measures**  Instrument(s)/process(es) used to measure results  (e.g. sign-in sheets, surveys, focus groups, etc.) | **C. Targets**  Level of success expected  (e.g. 80% approval rating, 10 day faster request turn-around time, etc.) |
| 1. Improved student exam scores | Establishment of weekly proctored testing, and additional weighting of mid-term exams. | 62% or better grade on all proctored exams |
| 2.Increase diversity | Enrollment data | 10% increase in enrollment and completion of minority and female students. |
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**Continuous Improvement Plan**

**Outcomes might not change from year to year. For example, if you have not met previous targets, you may wish to retain the same outcomes. *You must have at least one program learning outcome.* You may also add short-term administrative, technological, assessment, resource or professional development goals, as needed. Choose 1 to 2 outcomes from Table 1 above to focus on over the next two years.**

**A. Outcome(s)** -Results expected in this program (from column A on Table 1 above--e.g. Students will learn how to compare/contrast Conflict and Structural Functional theories; increase student retention in Nursing Program).

**B. Measure(s)** –Instrument(s)s/process(es) used to measure results (e.g. results of essay assignment, test item questions 6 & 7 from final exam, end of term retention rates, etc.).

**C. Target(s)** -Degree of success expected (e.g. 80% success rate, 25 graduates per year, increase retention by 2% etc.).

**D. Action Plan** -Implementation of the action plan will begin during the next academic year. Based on analysis, identify actions to be taken to accomplish outcome. What will you do?  
**E. Results Summary** - Summarize the information and data collected in year 1.  
**F. Findings** - Explain how the information and data has impacted the expected outcome and program success.   
**G. Implementation of Findings** – Describe how you have used or will use your findings and analysis of the data to make program improvements.

**Table 2. CIP Outcomes 1 & 2**

|  |  |
| --- | --- |
| 1. **Outcome #1** Click or tap here to enter text. | |
| 1. **Measure (Outcome #1)**   Click or tap here to enter text. | 1. **Target (Outcome #1)**   Click or tap here to enter text. |
| 1. **Action Plan (Outcome #1)**   Click or tap here to enter text. | |
| 1. **Results Summary (Outcome #1) TO BE FILLED OUT IN YEAR 2** | |
| 1. **Findings (Outcome #1) TO BE FILLED OUT IN YEAR 2** | |
| 1. **Implementation of Findings (Outcome #1) TO BE FILLED OUT IN YEAR 2** | |

**Table 2. CIP Outcomes 1 & 2 (continued)**

|  |  |
| --- | --- |
| 1. **Outcome #2** Click or tap here to enter text. | |
| 1. **Measure (Outcome #2)**   Click or tap here to enter text. | 1. **Target (Outcome #2)**   Click or tap here to enter text. |
| 1. **Action Plan (Outcome #2)**   Click or tap here to enter text. | |
| 1. **Results Summary (Outcome #2) TO BE FILLED OUT IN YEAR 2** | |
| 1. **Findings (Outcome #2) TO BE FILLED OUT IN YEAR 2** | |
| 1. **Implementation of Findings (Outcome #2) TO BE FILLED OUT IN YEAR 2** | |

**What happens next? The Program Review Report Pathway**

1. **Following approval by the Steering Committee,**

* Program Review Reports will be evaluated by the Leadership Team;
* After Leadership Team review, the reports will be posted on the Intranet prior to fall semester;
* At any point prior to Intranet posting, reports may be sent back for additional development by the unit.

1. **Unit responses to the Program Review Steering Committee recommendations received before July 31st will be posted with the Program Review Report.**
2. **Leadership Team members will work with program supervisors to incorporate Program Review findings into planning and activity changes during the next five years.**

**Please make sure to go back and complete your Executive Summary at the start of the Review.**