Program Review

Executive Summary

Heating Ventilation and Air Conditioning

Majors Reviewed:

- *Heating, Ventilation, & Air Conditioning Design Technology, B.S.*
- *Heating, Ventilation, & Air Conditioning (HP), A.A.S.*
- *Heating, Ventilation, & Air Conditioning (HV), A.A.S.*
- *Plumbing, Certificate*

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Heating, ventilation, and air conditioning (HVAC) and/or plumbing instruction has existed at Williamsport Technical Institute (WTI), the Williamsport Area Community College (WACC), and Penn College continuously since at least 1949. In 1996 a bachelor-degree major, Heating, Ventilation & Air Conditioning Design Technology (BHD), was added to the existing Plumbing Certificate (PH) and associate-degree Heating, Ventilation & Air Conditioning Technology (HP/HV) majors. The program is currently the eighth largest on campus with very steady enrollment.

According to the Pennsylvania Center for Workforce Information & Analysis, HVAC is considered a "High Priority Occupation" and is expected to grow at a rate of 14% in the coming years. The HVAC Advisory Committee believes that this growth is due to the need for educated technicians to install and service new, high efficiency, and technologically advanced equipment. The current national emphasis on 'green' jobs is also encouraging employment in the HVAC industry.

The HVAC program provides useful resources for the broader college as well as the region. The program offers certification exams for the National Oilheat Research Alliance (NORA) open to the industry. Faculty teach courses also required by the Building Automation Technology (BBT) and the Renewable Energy Technology (RE) majors. The lab facilities and equipment are used by instructors from Building Construction, Electrical, Architecture as well as Hospitality to enhance instruction involving building mechanical systems.

The department has a seasoned faculty consisting of seven full-time and four adjunct instructors who, as a group, boast 225 years of industry experience and 90 years of full-time college teaching experience. Faculty remain current through industry journals, professional development, and memberships in national industry associations, including the National Association of Oil and Energy Professionals (OESP) and the Air Conditioning Contractors of America (ACCA).

Due to the excellent faculty, curriculum, lab facilities, and equipment, Penn College's HVAC program is PAHRA accredited (Partners in Air Conditioning, Heating and Refrigeration Accreditation)—in fact, it is the only postsecondary institute in the Commonwealth accredited by PAHRA. The College is also a certified NORA (National Oilheat Research Alliance) training and testing center. Additionally, the associate and bachelor degree programs are endorsed by ACCA.

Graduation rates of 82% for the bachelor-degree major (BHD) and 51% for the associate-degree majors (HP/HV) during the period 2007 through 2014 exceed the rates of the college as a whole by over 15 percentage points. First-year retention rates, at 79% for BHD and 75% for HP/HV over the period 2007 through 2015, are significantly higher than the college average. Student learning is assessed by ICE (Industry Competency Exam) results, which have been consistently higher than state averages in some important areas. Student quality is demonstrated by participation in the ASHRAE (American Society for Heating Refrigeration and Air Condition Engineers) club and the ACCA (Air Conditioning Contractors of America) club. HVAC students also regularly win national industry scholarships and competitions including ASHRAE, AHRI, and OESP.

Student enrollment has been steady over the last six years, with an average enrollment in the past three years of 105 in the associate-degree major, 55 in the bachelor-degree major, and 5 in the plumbing certificate major. Classes are filled to 83 to 85 percent of capacity, on average, over the past three years.

Program revenues exceed costs in each of the past three years, generating a surplus of $533,550 in 2015. Additionally the department received equipment donations from local and national companies totaling $115,454 since 2013. As part of the program, students complete valued HVAC and plumbing installations that benefit the college and local community, including those for the Williamsport SPCA and Trinity Church as well as a long list of projects for Penn College facilities.

Successfully preparing students for employment in the HVAC, plumbing, and refrigeration industries is essential to the mission of the school and the college. Since every building in which people work or live requires HVAC and plumbing and these buildings use 40% of energy consumed, educated and skilled HVAC technicians and designers are needed for the present and the future workforce.

Over the past three years the program has successfully attracted and hired three highly qualified faculty, modified the advanced systems (heat pumps) class in a way that has raised ICE exam scores in that area to well above national averages, as well as procured new lab equipment that is being incorporated into classes to meet the challenges of the evolving industry.

The final section of this report examines the program challenges and strategies for the department. Challenges included in this review are related to low student scores in some areas of the ICE assessment exam, the need to be prepared for advancement in HVAC equipment technology, and the need to address more highly educated web-informed consumers.

Recommendations:

- Explore curriculum changes that address energy-conscious trends, including advanced controls, home sealing, indoor air quality, and complex high efficiency systems.
- Improve existing courses by incorporating the use of simulation software and increased troubleshooting of high efficiency equipment.
- Develop new elective courses that allow students to focus on specialized areas of the industry. Options include courses in estimating, energy auditing, building commissioning, and advanced electrical/building automation.
- Upgrade existing labs to increase the number of heating work stations and continue to seek and procure technically advanced equipment for the air conditioning lab.