

Report Assessment [SAC]: Department of Trades and Industry – Facilities Maintenance Technology

For this Assessment Report, the Department of Trades and Industry assessed student performance of the following, Degree outcomes, for the AAS in Facilities Maintenance Technology (FMT):

- Practice safety measures in all areas to prevent occupational incidents
- Determine problems in facilities systems
- Perform corrective maintenance in facilities systems
- Perform preventative maintenance in facilities systems
- Recognize interrelationships of facilities systems to avoid negative impact
- Communicate effectively through appropriate media with co-workers, customers, contractors, suppliers, and supervisors

Methods (a):

For the outcome: “Practice safety measures in all areas to prevent occupational incidents”, we collected and analyzed the final test results for course ELT-220 – Occupational Safety and Health Administration (OSHA) 30-Hour Safety Training. ELT 220 is only taught by a certified OSHA instructor and the Final Examination given in the class is a detailed, Federal-OSHA approved examination. In order to pass this test, a student must have a thorough understanding of federally mandated OSHA safety procedures universally applied throughout industry and on the job. We analyzed two-classes, one with 12 students and one with 23 students

Results (b):

The pass rate for all 35 students was 98% with one failing because he stopped attending. All 34 students passed with a letter grade of “A”. The pass rate of 98% was much better than we expected.

Methods (a):

For the Outcome: “Determine problems in Facilities Systems,” we collected and analyzed the final test results for one course, FMT -113 – Refrigeration Electrical III; and we developed a skills checklist that each student had to complete for second course FMT 102 – Refrigeration 102. In the FMT program there are many courses where students are required to perform troubleshooting on real-world, HVAC/R equipment in the Classrooms/Labs. ELT-201 – Electrical Motor Controls and ELT-125 – Basic Programmable Logic Controllers are other examples. FMT-113 and FMT-102 were chosen because they are the most representative.

Results (b):

For FMT-113, we collected and analyzed the final exam results of one class of 16 students. Refrigeration Electrical III is mostly trouble shooting of gas-furnaces, heat pumps, and air-conditioners. If a student is unable to do the trouble shooting lab exercises on the equipment, it is a certainty that the student could not pass the final exam. A passing grade was 70%. Six grades were 90% - 100%, nine grades were 80% - 90%, and one grade was 70% - 80%.

There were no specific areas of the exam where a majority of students gave incorrect answers.

Results (b):

The course content for FMT 102 centers on Commercial Refrigeration Equipment. During the course of the labs in FMT 102, students must complete nine specific tasks working with copper refrigeration tubing and also recovering refrigerants, evacuating and charging refrigeration systems, using proper tools and instruments. Successful completion of each task must be signed off on the Course/Lab sheet by the instructor. Students are performing these tasks on the same equipment found in real-world Industry.

One class of 16 students in the FMT-102 was analyzed and all 16 students received a passing sign off on each of the nine tasks. Only two students were asked to repeat a total of three tasks for a second time in order to receive the instructor sign off.

Results (b):

The results of the two assessments in FMT-113 and FMT-102 were better than we expected, given the intense "hands- on" component of these two courses.

Methods (a):

For the Outcomes: "Perform corrective maintenance in facilities systems; Perform preventative maintenance in facilities' systems; Recognize interrelationships of facilities systems to avoid negative impact", a team of two FMT Instructors and one Academic Professional collected and analyzed the "evaluation rubrics" from course FMT-280A - Co-operative Work Experience. FMT students are required to perform 240 hours of work in an approved facility or an approved HVAC/R service company. The employer/supervisor is the "instructor" for the student during these real-world work hours. Each 30 hours of facilities maintenance work earns 1 credit for the student and 8 credits are required for the Degree. The "evaluation rubric" includes a skills checklist and also narrative comments from the employer/supervisor.

The evaluation of 23 FMT-280A students were collected and analyzed over three terms. There was a large range of employers/supervisors offering these 23 students a co-op work site. The Veterans Administration Hospital, Enteck Corporation, Hunter-Davidson HVAC/R Service Company, and the Portland Community College Facilities Management Department are some examples of the sites and types of employers/supervisors involved in the FMT Co-op work program. All 23 employer/supervisors completed "evaluation rubrics" for the student.

Results (b):

There were no “unsatisfactory” marks given on any of the 23 evaluations in any skill area. There were only 2 marks indicating “need for improvement” on any of the 23 evaluations. The huge majority of marks given were for “out-standing” and “very good” on any of the 23 evaluations. The instructors and the Academic Professional analyzing the evaluations focused much of their attention on two main areas: “Job Learning/Skill Improvement and Quality of work”. All marks in these two areas were in the “Outstanding” or “Very Good” and the preponderance of written remarks were positive for all 23, FMT-280A students.

One narrative comment asked of employer/supervisors on the rubric is, “Would you recommend this student for employment in your own or another firm?” Nineteen employer/supervisors said “yes” and only 4 did not respond to the question. An example of a comment by an employer/supervisor in answer to this question is: “very much so, competent with tools and personal interaction.”

The overall results of evaluations for the FMT-280A are higher than we expected. We did not expect so many narrative comments be on the positive side, or so few “unsatisfactory” marks. Our overall conclusion is that our department is doing very well providing the technical hands-on skill to the FMT student, but, looking at the overall results, our department could do a better job in providing students the “soft” skills of effective communication and customer service necessary for the successful Facilities Maintenance/HVAC/R Technician.

Methods (a):

For the outcome: “communicate effectively through appropriate media with co-workers, customers, contractors, suppliers, and supervisors,” we once again chose course FMT-102 Refrigeration II, which centers on Commercial Refrigeration, to do this assessment. However, we used FMT 213 - Commercial Refrigeration Shop, which is an elective, hands-on Lab component of FMT-102, for this assessment. During the course of FMT 213, each student must work in a team to write, present, and execute a work order with an accompanying “invoice” and actually perform the service on a commercial refrigeration system, such as an ice maker. The student team must then, verbally, walk the instructor through the entire process – to the satisfaction of the instructor, before a passing grade is given. The work orders, invoices, and procedure are all recorded by the instructor and saved. Passing this lab means satisfactory completion of these real-world tasks.

Results (b):

We collected and analyzed the final grades for FMT-213 for one class of 20 students during Winter Term, 2011. All students passed and received a letter grade of “A”.

Identify Changes That Should Be Implemented

Our Department SAC has, as of the writing of this student assessment report, identified two changes that we are still discussing but which should be implemented.

First, we should add one more topic to the evaluation rubric for FMT-280A-Co-op Work Experience, titled "Overall Facilities Troubleshooting" for evaluation by the employer/supervisor. FMT-280A students already receiving evaluation of these skills during their Co-op work but an additional, written, check off would be clearer.

Second, the student assessments indicate that we are providing adequate, skillful, technical instruction, but our students could benefit from more discussion/instruction around workplace communication and customer service. There is already plenty of Instruction in our FMT 100, 101, 102, 103, 111, 112, 113, 122, 125, 128, 204 and 213 courses, around these "soft" skills, but we need to emphasize more of this Instruction that is already in place.