**Sinclair Community College**

**Continuous Improvement Annual Update 2013-14**

**Please submit to your dean and the Provost’s Office no later than Oct. 1, 2013**

**Department:** 0551 - Engineering Technical Design\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 0552 – Heating, Air Cond, & Refrigeration

Year of Last Program Review: FY 2008-2009

Year of Next Program Review: FY 2015-2016

**Section I: Department Trend Data, Interpretation, and Analysis**

**Degree and Certificate Completion Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Degree and Certificate Completion Trend Data (Raw Data is located in Appendix A*): i.e. What trends do you see in the above data? Are there internal or external factors that account for these trends? What are the implications for the department? What actions have the department taken that have influenced these trends? What strategies will the department implement as a result of this data?*

**Years 2010-2011 and 2011-2012 saw an increase in the number of graduates as quarter to semester conversion was underway and fully implemented for Fall Semester 2012. Many students within the program worked hard to get through their program of study while fully under the quarter system. It is natural, therefore, for completion rates to have fallen for last year (2012-2013).**

**The department is working closely with students and advising to help students who started under the quarter system and will be finishing under the semesters. It does not appear that all course equivalencies are automatically picked up by the system, so manual review of all student evaluations has been best. Students have been encouraged to meet with an academic counselor to ensure they are on track for graduation.**

**Without semester conversion, the data shows an increasing trend in graduation rates for Heating, Ventilation, Air Conditioning and Refrigeration with Engineering Technology Design showing an upward trend over the past three years.**

**As a department, we are working on ways to better track students within all programs. Because students are required to select a major when they register (especially if seeking financial aid), it is difficult to accurately account which students are enrolled in various courses as degree seeking, professional development or personal interest.**

**Course Success Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Course Success Trend Data (Raw Data is located in Appendix A). Looking at the success rate data provided in the Appendix for each course, please discuss trends for high enrollment courses, courses used extensively by other departments, and courses where there have been substantial changes in success.

**Departmental success rates for Engineering Technology Design (Mechanical Engineering Technologies) have remained fairly constant over the past several years, with a drop last academic year due (only slightly) to semester conversion. Success rates are above Science, Mathematics and Engineering and college wide percentages. Faculty engagement, improved tutorial services and an open computer lab have helped contribute to student’s success.**

**The HVAC success rates fell more than ETD in a large part because students were strongly encouraged to complete before semester conversion.**

**Within both programs, we continue to see self-developed cohorts that allow students to develop an effective support network that directly relates to their success.**

**MEE courses are calculus based and are part of the Engineering University Transfer parallel transfer degree.**

Please provide any additional data and analysis that illustrates what is going on in the department (examples might include accreditation data, program data, benchmark data from national exams, course sequence completion, retention, demographic data, data on placement of graduates, graduate survey data, etc.)

**Both programs received full accreditation from ETAC/ABET in the Fall of 2011. Data continues to be collected in support this accreditation. The next comprehensive review will occur in the 2016-2017 school year.**

**The department also performs face to face exit interviews of all graduates during their capstone experience. Comments from these interviews are passed along to faculty, discussed amongst advisory board members with any corrective action and/or improvements made as deemed necessary.**

**Section II: Progress Since the Most Recent Review**

Below are the goals from Section IV part E of your last Program Review Self-Study. Describe progress or changes made toward meeting each goal over the last year.

|  |  |  |
| --- | --- | --- |
| **GOALS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| NEED TO BE DEVELOPED. Self-study simply notes that “Comments made in sections a through d above describe the department’s direction in curriculum and course delivery and innovative applied learning techniques”. | In progress  Completed  No longer applicable | Both the MET and HVACR programs investigate and use various techniques to improve student learning based upon goals provided by the industry we serve as delivered by our advisory committess.  For example, the guitar class provides a serious look into product lifecycle management using a vehicle students find fun and attractive. This has been so successful that we use it as a recruiting tool in area high schools.  Additionally, our MET capstone project over the last three years involved the design and construction of the SAE baja buggy. This project included heavy industry involvement, hands‑on activity components, and applied learning.  Similary, the Integrated Capstone for the HVAC program (which involved working with Archtectural, Civil, Construction Management, and Environmental) has provided students with a near 'real life' experience replete with proper design process, discussions with industry engineers and sales persons, and interpersonal issues that require solution so as to get the job done.  The HVAC program has also been well supported by industry. Local business has donated thens of thousands of dollars in money and equipment to improve our education in HVAC controls and systems. This has included $25,000 worth of control products, $5,000 from ASHRAE to aid in the construction of a HW/CW system on which we will be able to train, and a new geothermal heat pump unit.  Also, local HVAC industry professionals visit our second year classes to make presentations to our students on current technologies relevant to the profession. We currently have six persons providing such activities in four separate (quarter) courses. Such discussions serve to reinforce to the student all the material they've been learning in the classroom.  Our HVAC students are all student members of ASHRAE. As such, they make at least two visits to a local chapter student nights each year. These visits are a required activity that is part of the second year curriculum. These visits result in our students gaining exposure to local industry professionals often resulting in an offer for a job interview. |

Below are the Recommendations for Action made by the review team. Describe the progress or changes made toward meeting each recommendation over the last year.

|  |  |  |
| --- | --- | --- |
| **RECOMMENDATIONS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| As the HVAC program has additional capacity, and there is a need for additional workers in the industry at a time when individuals in the community are seeking retraining, the department should explore creative means to market the degree and certificate programs to a variety of audiences. These could include e-marketing, a focus on green technologies, etc. In the marketing of this program, consideration should be given to differentiating Sinclair’s HVAC program in the public’s perception from programs offered at other institutions. | In progress  Completed  No longer applicable | In HVAC, there are at least eight programs in the region viewed as being competitive to our programs: MVCTC high school and Adult, UVJVS HS and Adult, Clark-Springfield HS and Adult, Kaplan College, and Warren County. Although no single program is truly competitive with our two-year program (all are residential while ours is commercial), the difference is not understood by the public. Until we are allowed to aggressively advertise our program, advertise the difference with competing programs, and feature the high degree of success and the lucrative salaries most of our graduates achieve, this will continue to be a problem.  As a department, we have signed up for nearly all high school career fairs in the area this academic year, including Engineer’s Day hosted by the division and Think College campus visit tours hosted by TechPrep to help spotlight the program. |
| While learning experiences designed to facilitate the achievement of general education outcomes as well as program outcomes appear to be in place, there is no documented evidence that those outcomes are being met. Support is available through the College-Wide Assessment Committee to design methods for collecting, analyzing, and documenting these outcomes. | In progress  Completed  No longer applicable | Although such evidence is collected throughout the program, the primary point of assessment occurs during capstone. Students are required to provide a number of written documents, presentations, and a final design. These documents are presented to the advisory members for comment and graded/assessed by capstone faculty. Shortcomings are documented under our capstone project 'Lessons Learned' list with improvements enacted over the following year where appropriate. |
| The department should consider the value of and need for the AAS degree in MET, given the current emphasis on the four year technical degree. Students with interest in mechanical engineering might be better served by the Engineering Science University Parallel degree. | In progress  Completed  No longer applicable | The MET program is one of the three most highly recognizable and one of the most popular engineering technology programs that can exist at any school nationally. Elimination of this program would be quite quite hurtful to the local community. This program does feed many of the area four-year engineering technology programs including University of Dayton and Miami University.  As the name implies, the Engineering Science University Parallel program serves a completely different audience than the MET program. ESUP is a pre‑engineering degree that transfers to any school with a four‑year Engineering Science curriculum such as Wright State and the University of Dayton. (Please note that UD has both Engineering Science and Engineering Technology programs) |
| The department is encouraged to confer with the Mathematics Department to explore means of improving student success. The formation of learning communities between math and early program courses might be an effective strategy. | In progress  Completed  No longer applicable | We have been reviewing the math sequencing in both programs to ensure it meets or exceeds industry standards and needs especially as we look to expand the MET program at Courseview. Miami University would be the closest school to which students enrolled at Courseview in MET might attend and alignment with their math requirements will allow a smoother transition for students. |
| Examine degree and certificate completion rates for the department’s programs and identify factors that contribute to low completion rates. Determine whether low productivity programs should be revised in order to attract and graduate more students or whether selected offerings should be discontinued. | In progress  Completed  No longer applicable | Trend data indicates increased completion rates. Our efforts have been successful and we will continue those efforts. |

**Section III: Assessment of General Education & Degree Program Outcomes**

The Program Outcomes for the degrees are listed below. **All program outcomes must be assessed at least once during the 5 year Program Review cycle, and assessment of program outcomes must occur each year**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General Education Outcomes** | To which degree(s) is this program outcome related? | Year assessed or to be assessed. | Assessment Methods  Used | What were the assessment results?  (Please provide brief summary data) |
| Critical Thinking/Problem Solving | | All programs | **2012-2013** |  |  |
| Values/Citizenship/Community | | All programs | **2013-2014** |  |  |
| Computer Literacy | | All programs | **2014-2015** |  |  |
| Information Literacy | | All programs | **2015-2016** |  |  |
| Oral Communication | | All programs | **2016-2017** |  |  |
| Written Communication | | All programs | **2016-2017** |  |  |
|  | |  |  |  |  |
| **Program Outcomes** | | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment Methods  Used | What were the assessment results?  (Please provide brief summary data) |
| Communicate effectively in a technical environment, including written and oral communication, effective listening and technical presentation. | | SCC 1101, ENG 1101, COM 2211, MET 1131, CAT 1111, CAT 1131 | 2012-13 | Assessment of capstone.  Graduate exit interviews.  Employer surveys.  Co-op feedback. | Current level is an improvement over years past, however, increased levels of proper communication encouraged. |
| Apply principles of environmental safety and health to HVACR system operation, maintenance, troubleshooting and design. | | HVA 1201, HVA 2251, HVA 2301 | 2013-14 |  |  |
| Apply principles of mathematics, physics, chemistry, thermodynamics, psychrometrics and fluid mechanics to HVACR systems. | | MAT 1280, MAT 1290, PHY 1131, HVA 1301, HVA 1351, EET 1120 | 2012-13 | Assessment of capstone.  Placement testing results.  Locally developed tests and quizzes. | Students are generally underprepared to enter the program mathematically and often start in DEV courses or courses below the required math sequence.  One strong point of our program is incorporating real world problems and solutions into the curriculum.  Students tend to have a better success rate and material retention when the physical sciences are related to their chosen topic of study. |
| Demonstrate an in-depth understanding of the troubleshooting, commissioning, design and documentation processes for commercial HVACR systems and subsystems via the application of industry accepted techniques, methods, and tools including but not limited to handbooks, manuals, codes and software. | | EET 1139, HVA 2201, HVA 1451, HVA 2780, HVACR elective, HVACR elective | 2014-15 |  |  |
| Recognize professional, ethical and societal responsibilities, respect diversity and commit to life-long learning. | | MET 2711, OTM Social/Behavioral, OTM Arts/Humanities | 2015-16 |  |  |
| Apply basic science and fundamental engineering studies to identify, analyze and integrate solutions to emerging issues in environmental engineering technology including sustainability. | | OTM (Social/Behavioral), EGV 2781, EGV 2701, MAT 1310, MAT 1410, MET 1161, PHY 1141, CHE 1211, CHE 1251, CHE 1221, CHE 1261, MET 2201, CAT 2421, MET 2301 | 2013-14 |  |  |
| Respect the ethical responsibility of public institutions and private organizations to society pertaining to environmental engineering technology. | | HUM 1135, MET 2711 | 2014-15 |  |  |
| Demonstrate knowledge and skills to assess and initiate response to hazardous exposures, minimizing their risk and the risk to surrounding populations, immediate property and the environment. | | FST 1555 | 2012-13 | Graduate exit interviews.  Locally developed tests and quizzes.  Co-op feedback. | Course continues to provide the necessary industry accepted training for hazardous material training.  Scheduling can be a challenge if it is offered as a week long course during the semester. Working with FST chair to offer training during Winter or Spring break.  Note: This class is now serviced by the Fire Science Department effective Fall 2012. |
| Follow and apply protocols for environmental site assessments. Detect the conditions indicative of releases or threatened releases of hazardous substances, pollutants, contaminants, petroleum, petroleum products and controlled substances by records review or field sampling. Identify potential environmental liabilities associated with properties considered for transfer. | | EGV 1501, CAT 1501, CAT 2501 | 2013-14 |  |  |
| Apply principles of system design, management and operation of water supply/treatment, including skills and knowledge to sample and interpret contamination distribution in surface water and ground water. | | EGV 1551, EGV 2551 | 2015-16 |  |  |
| Apply principles of system design, management and operation of waste treatment and disposal, including skills and knowledge to identify, analyze and process hazardous substances and wastes | | EGV 2501 | 2015-16 |  |  |
| Apply knowledge of environmental laws to support compliance with current and future local, state and federal requirements. | | EGV 1501, EGV 2501, EGV 1551, FST 1555 | 2014-15 |  |  |
| As an interdisciplinary team member, develop products, processes, solve problems, perform project planning, prepare time estimates and make sound, ethical decisions. | | MAN 2110, MET 124 | 2012-13 | Assessment of capstone.  Graduate exit interviews.  Co-op feedback. | Students have performed well in interdisciplinary teams.  Faculty have made improvements and modifications to the integrated capstone over the past five years resulting in positive reviews from advisory board members and students. |
| Design in detail individual parts from functional sketches provided by an engineer, and model them using a three-dimensional parametric modeler. (i.e. 3-D CAD) | | MET 1301, MET 2101, MET 2151, MET 2201, MET 2251, MET 2780 | 2014-15 | Assessment of capstone.  Locally developed tests and quizzes.  Co-op feedback. | Students excel in hands on skills such as design and modeling.  Software in use is current version of the industry standard.  With this skillset, students find increased job opportunities. |
| Use mathematical and scientific skills to analyze product properties including form, function, fit, strength, thermal, fluid, etc. | | MAT 1310, MAT 1410, PHY 1141, MET 1111, MET 1161, MET 2301, MET 2351, MET 2401 | 2012-13 |  |  |
| Use solid model data as input to drive rapid prototyping or N/C machining equipment. | | CAM 1109, MET 1281 | 2013-14 |  |  |
| Document the product/process model using appropriate means (multi-view drawings, pictorials, catalog/manual illustrations, charts/graphs, shaded image, animation, etc.) | | MET 1201, MET 1301, MET elective | 2015-16 |  |  |

**General Education Outcomes**

1. Are changes planned as a result of the assessment of general education outcomes? If so, what are those changes?

**Advisory board feedback indicates that writing assignments such as memos, emails, notes, and reports are an ever increasing part of any job. The department will look at ways to improve current writing assignments and evaluate whether or not additional assignments should be developed to allow students to hone their writing skills.**

1. How will you determine whether those changes had an impact?

**Long term feedback from employers who hire our students.**

**Program Outcomes**

1. Are changes planned as a result of the assessment of program outcomes? If so, what are those changes?

**No, both programs are fully accredited through ETAC/ABET and all program outcomes are in line with this accreditation.**

1. How will you determine whether those changes had an impact?

**N/A**

**Improvement Efforts**

1. What were the results of changes that were planned in the last Annual Update? Are further changes needed based on these results?

**MET1111 Preparatory Math has been fully developed and taught. The environmental program which serve HVACR with electives, has been slowly refocusing to address more sustainability issues.**

1. Are there any other improvement efforts that have not been discussed in this Annual Update submission?

**Through an equipment grant through the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) and under the direction of Professor Russ Marcks, students have helped design and build a chilled water/hot water system. This system will be utilized as a capstone commissioning exercise for the first time in Spring Semester 2014 capstone.**

**APPENDIX – PROGRAM COMPLETION AND SUCCESS RATE DATA**

**Degree and Certificate Completion**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Division | Department | Department Name | Program | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 | FY 12-13 |
| SME | 0551 | Engineering Technical Design | DD.STC | 4 | 4 | 6 | 7 | 3 | 2 |
| SME | 0551 | Engineering Technical Design | DRT.AAS | . | 1 | 1 | . | . | . |
| SME | 0551 | Engineering Technical Design | EGMT.S.ATS | . | . | . | . | . | 1 |
| SME | 0551 | Engineering Technical Design | EMT.AAS | 14 | 7 | 3 | . | 2 | . |
| SME | 0551 | Engineering Technical Design | ENRGY.S.STC | . | . | . | . | . | 1 |
| SME | 0551 | Engineering Technical Design | ENRGY.STC | . | . | . | 1 | 3 | 2 |
| SME | 0551 | Engineering Technical Design | ETD.AAS | 2 | . | 2 | 5 | 3 | 3 |
| SME | 0551 | Engineering Technical Design | EVT.AAS | 4 | 5 | 4 | 6 | 6 | 3 |
| SME | 0551 | Engineering Technical Design | IDGT.AAS | 5 | 2 | . | . | . | . |
| SME | 0551 | Engineering Technical Design | MEGT.AAS | . | 5 | 6 | 8 | 14 | 5 |
| SME | 0551 | Engineering Technical Design | METMM.STC | 1 | 1 | . | . | . | . |
| SME | 0552 | Heating, Air Cond, & Refrig | FCMG.STC | 1 | 1 | . | . | 1 | . |
| SME | 0552 | Heating, Air Cond, & Refrig | HACO.AAS | 2 | 1 | 1 | . | 1 | . |
| SME | 0552 | Heating, Air Cond, & Refrig | HVAAS.STC | . | 3 | 2 | . | . | . |
| SME | 0552 | Heating, Air Cond, & Refrig | HVACR.AAS | 1 | 1 | 5 | 5 | 8 | 3 |
| SME | 0552 | Heating, Air Cond, & Refrig | LCHS.S.STC | . | . | . | . | . | 5 |
| SME | 0552 | Heating, Air Cond, & Refrig | LCHS.STC | 13 | 10 | 19 | 22 | 24 | 8 |
| SME | 0552 | Heating, Air Cond, & Refrig | PPJC.STC | . | . | . | 6 | . | . |
| SME | 0552 | Heating, Air Cond, & Refrig | SHAS.STC | . | 12 | . | . | . | . |

**Course Success Rates**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Department** | **Department Name** | **Course** | **FY 07-08** | **FY 08-09** | **FY 09-10** | **FY 10-11** | **FY 11-12** | **FY 12-13** |
| 0551 | Engineering Technical Design | EGV-1501 | . | . | . | . | . | 70.6% |
| 0551 | Engineering Technical Design | EGV-2781 | . | . | . | . | . | 100.0% |
| 0551 | Engineering Technical Design | ETD-101 | 74.4% | 72.8% | 61.7% | 73.5% | 58.9% | 85.7% |
| 0551 | Engineering Technical Design | ETD-102 | 75.0% | 80.0% | 71.4% | 56.5% | 77.8% | . |
| 0551 | Engineering Technical Design | ETD-110 | 85.7% | 90.0% | 92.5% | 95.0% | 100.0% | . |
| 0551 | Engineering Technical Design | ETD-118 | 75.0% | 73.5% | 79.1% | 68.8% | 100.0% | . |
| 0551 | Engineering Technical Design | ETD-121 | 69.7% | 81.6% | 80.9% | 64.4% | 62.7% | 100.0% |
| 0551 | Engineering Technical Design | ETD-128 | 73.9% | 72.3% | 75.2% | 68.9% | 74.3% | 60.0% |
| 0551 | Engineering Technical Design | ETD-132 | . | . | 75.0% | 82.4% | 84.6% | . |
| 0551 | Engineering Technical Design | ETD-133 | . | . | . | 90.9% | 87.5% | . |
| 0551 | Engineering Technical Design | ETD-150 | . | 69.2% | 88.0% | 92.9% | 61.9% | . |
| 0551 | Engineering Technical Design | ETD-155 | . | 71.4% | 72.7% | 78.6% | 83.3% | . |
| 0551 | Engineering Technical Design | ETD-198 | 77.6% | 73.7% | 73.2% | 70.9% | 66.7% | 73.0% |
| 0551 | Engineering Technical Design | ETD-199 | 74.2% | 77.9% | 79.9% | 77.7% | 69.1% | 81.8% |
| 0551 | Engineering Technical Design | ETD-211 | 84.6% | 70.3% | 77.4% | 74.4% | 62.5% | . |
| 0551 | Engineering Technical Design | ETD-212 | 72.0% | 78.8% | 77.8% | 90.0% | 90.5% | . |
| 0551 | Engineering Technical Design | ETD-213 | 65.4% | 62.1% | 48.8% | 65.2% | 42.4% | . |
| 0551 | Engineering Technical Design | ETD-214 | 86.4% | 100.0% | 86.7% | 100.0% | 90.9% | . |
| 0551 | Engineering Technical Design | ETD-222 | 60.9% | 63.4% | 50.9% | 96.3% | 97.1% | . |
| 0551 | Engineering Technical Design | ETD-228 | 100.0% | 100.0% | 91.7% | . | . | . |
| 0551 | Engineering Technical Design | ETD-230 | 77.0% | 66.7% | 76.9% | 90.0% | 75.0% | 90.0% |
| 0551 | Engineering Technical Design | ETD-231 | 90.0% | . | . | . | . | . |
| 0551 | Engineering Technical Design | ETD-238 | . | 90.0% | 90.0% | 90.0% | 95.5% | . |
| 0551 | Engineering Technical Design | ETD-245 | 54.5% | 66.7% | 88.9% | 100.0% | 100.0% | . |
| 0551 | Engineering Technical Design | ETD-251 | . | 100.0% | 100.0% | 100.0% | 95.5% | . |
| 0551 | Engineering Technical Design | ETD-252 | . | 98.5% | 100.0% | 100.0% | 100.0% | . |
| 0551 | Engineering Technical Design | ETD-255 | . | 88.9% | 100.0% | 100.0% | 77.8% | . |
| 0551 | Engineering Technical Design | ETD-260 | . | 20.0% | . | . | . | . |
| 0551 | Engineering Technical Design | ETD-261 | . | . | 76.9% | 62.1% | 63.8% | 80.0% |
| 0551 | Engineering Technical Design | ETD-270 | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| 0551 | Engineering Technical Design | ETD-278 | 100.0% | 100.0% | 100.0% | 95.0% | 95.5% | . |
| 0551 | Engineering Technical Design | ETD-280 | 90.0% | 94.1% | 70.6% | 75.0% | 79.2% | . |
| 0551 | Engineering Technical Design | ETD-284 | 92.3% | 94.1% | 93.0% | 93.9% | 89.8% | . |
| 0551 | Engineering Technical Design | ETD-287 | 83.3% | . | 88.9% | 100.0% | . | . |
| 0551 | Engineering Technical Design | ETD-291 | 95.8% | 86.7% | 90.0% | 84.2% | 100.0% | . |
| 0551 | Engineering Technical Design | ETD-297 | 100.0% | 95.8% | 91.7% | 100.0% | 89.3% | . |
| 0551 | Engineering Technical Design | MEE-2101 | . | . | . | . | . | 57.1% |
| 0551 | Engineering Technical Design | MEE-2301 | . | . | . | . | . | 87.5% |
| 0551 | Engineering Technical Design | MEE-2401 | . | . | . | . | . | 100.0% |
| 0551 | Engineering Technical Design | MET-1101 | . | . | . | . | . | 65.3% |
| 0551 | Engineering Technical Design | MET-1111 | . | . | . | . | . | 75.0% |
| 0551 | Engineering Technical Design | MET-1131 | . | . | . | . | . | 63.9% |
| 0551 | Engineering Technical Design | MET-1151 | . | . | . | . | . | 81.7% |
| 0551 | Engineering Technical Design | MET-1201 | . | . | . | . | . | 58.5% |
| 0551 | Engineering Technical Design | MET-1241 | . | . | . | . | . | 77.8% |
| 0551 | Engineering Technical Design | MET-1281 | . | . | . | . | . | 90.0% |
| 0551 | Engineering Technical Design | MET-1301 | . | . | . | . | . | 76.9% |
| 0551 | Engineering Technical Design | MET-1331 | . | . | . | . | . | 100.0% |
| 0551 | Engineering Technical Design | MET-1371 | . | . | . | . | . | 82.6% |
| 0551 | Engineering Technical Design | MET-2151 | . | . | . | . | . | 83.3% |
| 0551 | Engineering Technical Design | MET-2201 | . | . | . | . | . | 51.5% |
| 0551 | Engineering Technical Design | MET-2251 | . | . | . | . | . | 43.6% |
| 0551 | Engineering Technical Design | MET-2297 | . | . | . | . | . | 83.3% |
| 0551 | Engineering Technical Design | MET-2301 | . | . | . | . | . | 66.7% |
| 0551 | Engineering Technical Design | MET-2351 | . | . | . | . | . | 80.0% |
| 0551 | Engineering Technical Design | MET-2401 | . | . | . | . | . | 85.7% |
| 0551 | Engineering Technical Design | MET-2711 | . | . | . | . | . | 77.8% |
| 0551 | Engineering Technical Design | MET-2780 | . | . | . | . | . | 100.0% |
| 0552 | Heating, Air Cond, & Refrig | CAT-2501 | . | . | . | . | . | 83.3% |
| 0552 | Heating, Air Cond, & Refrig | HVA-101 | 85.7% | 76.9% | 69.2% | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-102 | 100.0% | 100.0% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-103 | 100.0% | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-104 | 100.0% | 100.0% | 100.0% | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-112 | 92.3% | 71.4% | 75.0% | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-113 | . | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-114 | 46.7% | 90.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-1201 | . | . | . | . | . | 46.7% |
| 0552 | Heating, Air Cond, & Refrig | HVA-122 | . | 95.7% | . | . | 85.7% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-1221 | . | . | . | . | . | 68.5% |
| 0552 | Heating, Air Cond, & Refrig | HVA-123 | 100.0% | 95.5% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-124 | . | 100.0% | 100.0% | . | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-1241 | . | . | . | . | . | 94.7% |
| 0552 | Heating, Air Cond, & Refrig | HVA-1261 | . | . | . | . | . | 91.7% |
| 0552 | Heating, Air Cond, & Refrig | HVA-1301 | . | . | . | . | . | 88.9% |
| 0552 | Heating, Air Cond, & Refrig | HVA-1351 | . | . | . | . | . | 90.0% |
| 0552 | Heating, Air Cond, & Refrig | HVA-140 | 82.5% | 80.0% | 79.3% | 70.4% | 78.6% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-1401 | . | . | . | . | . | 88.2% |
| 0552 | Heating, Air Cond, & Refrig | HVA-141 | 84.2% | 100.0% | 85.7% | 97.4% | 89.7% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-144 | 82.9% | 68.0% | 72.8% | 71.3% | 66.1% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-1451 | . | . | . | . | . | 75.0% |
| 0552 | Heating, Air Cond, & Refrig | HVA-160 | 87.0% | 86.1% | 87.5% | 81.8% | 95.8% | 80.0% |
| 0552 | Heating, Air Cond, & Refrig | HVA-162 | 93.3% | 74.5% | 76.9% | 73.8% | 91.2% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-170 | 66.7% | 100.0% | 84.6% | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-174 | 100.0% | 92.3% | 83.3% | 83.3% | 75.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-177 | 77.5% | 80.0% | 82.4% | 79.7% | 78.1% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-180 | 96.0% | 88.9% | 83.3% | 89.3% | 92.3% | 80.0% |
| 0552 | Heating, Air Cond, & Refrig | HVA-184 | 81.8% | 80.9% | 73.0% | 91.8% | 85.3% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-186 | 82.4% | . | 86.7% | 100.0% | 84.6% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-190 | 87.5% | 89.5% | 100.0% | 81.1% | 96.6% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-194 | 93.8% | 94.7% | 100.0% | 100.0% | 92.6% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-201 | 100.0% | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-202 | 100.0% | 100.0% | 80.0% | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-203 | 85.7% | 100.0% | 100.0% | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-204 | 83.3% | 100.0% | 100.0% | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-211 | . | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-212 | 100.0% | 100.0% | . | 66.7% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-213 | . | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-214 | 100.0% | 100.0% | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-221 | 100.0% | 88.0% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-222 | . | 100.0% | 100.0% | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-223 | 90.0% | 95.7% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-224 | . | 96.0% | 100.0% | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-2297 | . | . | . | . | . | 100.0% |
| 0552 | Heating, Air Cond, & Refrig | HVA-231 | . | 100.0% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-232 | . | 100.0% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-234 | . | . | 100.0% | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-235 | . | . | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-236 | 92.3% | . | . | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-240 | 57.1% | 87.5% | 85.7% | 75.0% | 88.9% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-243 | 100.0% | 80.0% | . | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-250 | 100.0% | 100.0% | 92.3% | 100.0% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-253 | 50.0% | 66.7% | 62.5% | 80.0% | 54.5% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-254 | 100.0% | 100.0% | 71.4% | 87.5% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-270 | . | . | . | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-272 | 85.7% | 100.0% | 85.7% | 91.7% | 87.5% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-276 | 83.3% | . | 83.3% | 90.9% | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-278 | 100.0% | 100.0% | 100.0% | 100.0% | 90.9% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-286 | 66.7% | 66.7% | 68.8% | 87.0% | 95.2% | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-288 | 84.6% | 87.5% | . | . | . | . |
| 0552 | Heating, Air Cond, & Refrig | HVA-297 | 93.0% | 90.8% | 83.3% | 100.0% | 100.0% | . |
| 0552 | Heating, Air Cond, & Refrig | MEE-2201 | . | . | . | . | . | 60.0% |
| 0552 | Heating, Air Cond, & Refrig | MET-1161 | . | . | . | . | . | 27.3% |
| 0552 | Heating, Air Cond, & Refrig | MET-2101 | . | . | . | . | . | 75.0% |