**Sinclair Community College**

**Continuous Improvement Annual Update 2014-15**

**Please submit to your Division Assessment Coordinator / Learning Liaison for feedback no later than March 1, 2015**

**After receiving feedback from your Division Assessment Coordinator, please revise accordingly and make the final submission to your dean and the Provost’s Office no later than May 1, 2015**

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

Year of Last Program Review: FY 2013-2014

Year of Next Program Review: FY 2018-2019

**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?*

The trend data shows that enrollment has declined over the past two years. There was a considerable increase through 2012 as students were highly encouraged to graduate before semester conversion.

Factors beyond semester conversion include high attrition from non-prerequisite introductory courses, broken links on the mechanical webpages on the college’s website, lack of discipline specific funding for direct marketing, and increased competition (marketing) from other schools. It should be noted that Sinclair’s HVACR program is the only one in the area that covers commercial systems in addition to residential. In the Mechanical Engineering Technology program, some students nearly completed the program but fell short of graduation as they did not complete courses not accepted by four year schools.

Faculty have done a great job of reorganizing introductory coursework to include a better balance of labs and classroom time. Labs are now being introduced earlier so that students are captured in the program versus leave after weeks of only classroom instruction. The webpages are now displaying, though formatting is an issue. Faculty are part of the new web redesign that will be launched this summer.

A few years ago, the University of Dayton announced that they would discontinue their Mechanical Engineering Technology bachelor’s degree. We were a large feeder to that program. Without a convenient place to transfer, students may have been apprehensive about perusing the program. UD has since reversed this decision and we hope that as a result students will once again be more interested in starting in our program and finishing in the UD program.

Faculty have also worked hard to reduce the number of credit hours to finish an associate degree. Mechanical Engineering Technology has gone from 74 hours to 64 hours and Heating Ventilation Air Conditioning and Refrigeration has gone from 71 hours to 62. These reductions meet state mandates of 65 hours and have the potential to increase enrollment by requiring fewer hours to complete. Offerings were balanced between students who need courses for transfer and courses needed for industry.

**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.

In Mechanical Engineering Technology, success rates are higher than the division, but about equal to collegewide. In HVAC-R, success rates are lower than collegewide but higher than the division.

The department currently has courses that are utilized by degree programs both within and outside of the department. Some courses, such as MET1131 PC Applications is used by all degree seekers in the department and helps sustain the program. MET1161 Advanced Analytical Tools for Engineering Technology has been completely revamped to increase student success rates. These changes will be in place for Fall Semester 2015. Another course that has been completely restructured is HVA1201 Basic Heating Systems with Cooling. This course now introduces students to the lab much earlier in the curriculum. Recent feedback from faculty is that there has been less attrition as students spend time working with their hands earlier in their program.

The department has also been working with academic advising to make sure counselors understand the programs and career opportunities, especially with the reduction in hours. The department has also been working with local high schools to develop articulation agreements in Mechanical Engineering Technology for short term certificates that lead to a two year degree.

Mechanical Engineering courses (used in the EUT degree) are calculus based. Naturally, some students do not do well their first attempt. The four courses housed in ETD have now been taught for a couple of years in a semester format and are more polished than when first introduced.

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 are accredited by ETAC of ABET. The department is seeking reaccreditation for both Mechanical Engineering Technology and HVAC-R Engineering Technology as well as two other programs, Civil Engineering Technology and Environmental Engineering Technology. The department is also seeking accreditation for Architectural Technology and Construction Management Technology for the first time. This review process will take place in 2016. Student work is currently being gathered and evaluated.

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 are made in courses and the program 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 [x] 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.

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| --- | --- | --- |
| **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 [x] 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.Efforts have been made to help educate counselors in the student advising office on courses, degree requirements, internships and career opportunities of the programs.As a department, we continue to sign for high school career fairs, including Engineer’s Day hosted by the division, Think College campus visits and tours hosted by TechPrep to help spotlight both the HVACR and MET programs. |
| 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 [x] 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 [x]  | 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 [x] 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.A recent revision of the curriculum has replaced Tech Math with MAT1580 Precalculus in hopes of better preparing students for both industry and continuing education. |
| 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 [x] No longer applicable [ ]  | Trend data indicates increased completion rates. Our efforts have been successful and we will continue those efforts. |

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| Please respond to the following items regarding external program accreditation. |
| **Date of Most Recent Program Accreditation Review** | Date of most recent accreditation review: \_2010\_\_\_\_\_\_\_\_\_\_\_\_**OR**[ ]  Programs in this department do not have external accreditation  |
| **Please describe any issues or recommendations from your last accreditation review (if applicable)** | No known issues. |
| **Please describe progress made on any issues or recommendations from your last accreditation review (if applicable)** | Currently preparing for next review in 2016. |

**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**.

**PLEASE NOTE – FOR THE NEXT TWO YEARS, GENERAL EDUCATION OUTCOME ASSESSMENT WILL BE TEMPORARILY POSTPONED. WE WOULD ASK THAT IN THIS ANNUAL UPDATE YOU IDENTIFY AT LEAST ONE COURSE IN YOUR DEGREE PROGRAM(S) WHERE ASSESSEMENT AT THE MASTERY LEVEL WILL OCCUR FOR THE FOLLOWING THREE GENERAL EDUCATION OUTCOMES:**

* **CRITICAL THINKING/PROBLEM SOLVING**
* **INFORMATION LITERACY**
* **COMPUTER LITERACY**

**NOTE THAT THERE WILL NEED TO BE AT LEAST ONE EXAM / ASSIGNMENT / ACTIVITY IN THIS COURSE THAT CAN BE USED TO ASSESS MASTERY OF THE COMPETENCY.**

**YOU MAY ALSO SUBMIT ASSESSMENT RESULTS FOR THESE GENERAL EDUCATION COMPETENCIES IF YOU HAVE THEM, BUT IT WILL BE CONSIDERED OPTIONAL**.

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| **General Education Outcomes** | To which degree(s) is this program outcome related? | Year courses identified where mastery of general education competency will be assessed. | PLEASE INDICATE AT LEAST ONE COURSE WHERE MASTERY OF THE COMPETENCY WILL BE ASSESSED FOR EACH OF YOUR DEGREE PROGRAMS | What were the assessment results for this General Education competency? (Please provide brief summary data)**NOTE: - THIS IS OPTIONAL FOR THE FY 2014-15 AND FY 2015-16 ANNUAL UPDATES** |
| Critical Thinking/Problem Solving | All programs | **2014-2015** | MET2780 Mechanical Engineering Technology CapstoneHVA2780 Heating Ventilation Air Conditioning Engineering Technology Capstone Project |  |
| Information Literacy | All programs | **2014-2015** | MET2780 Mechanical Engineering Technology CapstoneHVA2780 Heating Ventilation Air Conditioning Engineering Technology Capstone Project |  |
| Computer Literacy | All programs | **2014-2015** | MET2780 Mechanical Engineering Technology CapstoneHVA2780 Heating Ventilation Air Conditioning Engineering Technology Capstone Project |  |
| Values/Citizenship/Community | All programs | **2015-2016** | Due in FY 2015-16 |  |
| Oral Communication | All programs | **N/A** | COM 2206/2211 |  |
| Written Communication | All programs | **N/A** | ENG 1101 |  |
| Are changes planned as a result of the assessment of general education outcomes? If so, what are those changes | **OPTIONAL FOR FY 2014-15** |
| How will you determine whether those changes had an impact?  | **OPTIONAL FOR FY 2014-15** |

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| **HVAC-R Engineering Technology****Program Outcomes** | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment MethodsUsed | What were the assessment results? (Please provide brief summary data) |
| 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. | EET1120EET1139HVA 2780 HVA ElectiveHVA1201HVA1221HVA1241HVA1301HVA1351HVA1401HVA2251HVA2351 | 2014-15 | Assessment of capstone. | Feedback from industry led advisory board members showed favorable opinions of the educational achievements of capstone students. |
| Communicate effectively in a technical environment, including written and oral communication, effective listening and technical presentation. | CAT1111ENG1101 COM2211 MET1131  | 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. |
| Recognize professional, ethical and societal responsibilities, respect diversity and commit to lifelong learning.  | HVA ElectiveMET2711OTM Social & Behavioral Sciences | 2015-16 |       |       |
| Apply principles of mathematics, physics, chemistry, thermodynamics, psychrometrics and fluid mechanics to HVACR systems. | CAT1131EET1120HVA1301HVA1351MET1580PHY1141 | 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. |
| Apply principles of environmental safety and health to HVACR system operation, maintenance, troubleshooting and design. | HVA 1201 HVA 2251 HVA 2351HVA 1301HVA Elective | 2013-14 | Locally developed tests and quizzes.Lab observations. | Students have a low rate of injury in the lab. Student to teacher ratios are kept to a manageable number. |

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| **Mechanical Engineering Technology****Program Outcomes** | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment MethodsUsed | What were the assessment results? (Please provide brief summary data) |
| Use mathematical and scientific skills to analyze products including form, function, fit, strength, thermal and fluid properties, etc. | CAM1109MAT1580MET ElectiveMET1111 MET1161 MET2101MET2151MET2201MET2251MET2301MET2351MET2401MET2780PHY1141  | 2012-13 | Locally developed tests and quizzes. | Review of student work in MET1161 showed a need to revamp coursework. These changes were made and will be analyzed beginning next school year. |
| Recognize professional, ethical and societal responsibilities, respect diversity and commit to lifelong learning.  | MET ElectiveMET2711OTM Social & Behavioral Sciences  | 2015-16 |       |       |
| 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 ElectiveMET1231MET1301 MET2780 | 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.  |
| As an interdisciplinary team member, develop products, processes, solve problems, perform project planning, prepare time estimates and make sound ethical decisions. | MET1241MET1281MET2780 | 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. |
| Communicate effectively orally, in writing and graphically on an interdisciplinary team as design technician using appropriate tools. | ENG1101 COM2211 MET1131 MET Elective | 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. |
| Document the product/process model using appropriate means (multi-view drawings, pictorials, catalog/manual illustrations, charts/graphs, shaded image, animation, etc.) | MET ElectiveMET1231MET1241MET1281MET1301MET2780 | 2015-16 |       |       |

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| **Are changes planned as a result of the assessment of program outcomes? If so, what are those changes?**  | Both HVACR and MET programs were reduced to be under 65 semester hours for degree completion. Courses were combined and deleted after careful review and the most extensive changes since semester conversion. Assessment of outcomes will be monitored closely as we begin ETAC/ABET reaccreditation of both programs. |
| **How will you determine whether those changes had an impact?**  | Advisory board members do an excellent job of helping the department stay current and shaping classes to fit industry needs. |

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

**Degree and Certificate Completion**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Division | Department | Department Name | Program | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 | FY 12-13 | FY 13-14 |  |
| SME | 0551 | Engineering Technical Design | DD.S.STC | . | . | . | . | . | . | 2 |  |
| 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 | 1 |  |
| SME | 0551 | Engineering Technical Design | ENRGY.STC | . | . | . | 1 | 3 | 2 | 1 |  |
| SME | 0551 | Engineering Technical Design | ETD.AAS | 2 | . | 2 | 5 | 3 | 3 | 1 |  |
| SME | 0551 | Engineering Technical Design | EVT.AAS | 4 | 5 | 4 | 6 | 6 | 3 | 1 |  |
| SME | 0551 | Engineering Technical Design | EVT.S.AAS | . | . | . | . | . | . | 2 |  |
| SME | 0551 | Engineering Technical Design | IDGT.AAS | 5 | 2 | . | . | . | . | . |  |
| SME | 0551 | Engineering Technical Design | MEGT.AAS | . | 5 | 6 | 8 | 14 | 5 | 1 |  |
| SME | 0551 | Engineering Technical Design | MEGT.S.AAS | . | . | . | . | . | . | 5 |  |
| SME | 0551 | Engineering Technical Design | METMM.STC | 1 | 1 | . | . | . | . | . |  |
| SME | 0552 | Heating, Air Cond, & Refrig | FCMG.S.STC | . | . | . | . | . | . | 2 |  |
| 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 | 1 |  |
| SME | 0552 | Heating, Air Cond, & Refrig | HVACR.S.AAS | . | . | . | . | . | . | 6 |  |
| SME | 0552 | Heating, Air Cond, & Refrig | LCHS.S.STC | . | . | . | . | . | 5 | 2 |  |
| 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**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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% |