Technical Diploma
Program Code: 30-401-4
Total Credits: 25

Mid-State’s Heating, Ventilation, and Air Conditioning program provides the hands-on foundation needed for an entry-level position in the heating, ventilation, air conditioning (HVAC) fields. Graduates will understand the various components of heating, ventilation, air-conditioning, and refrigeration systems, including furnaces, ductwork, boilers, hydronic piping, HRVs (heat recovery ventilators), evaporators, condensers, circuits, and controls. Students will also explore geothermal, biomass, and solar heating systems. Through hands-on classroom lab activities, students will join various piping types, design and construct ductwork, and install a complete residential HVAC system. They will also learn the electrical skills necessary to read wiring diagrams and troubleshoot mechanical control systems. Graduates are prepared to take the EPA 608 Technician Certification exam for refrigerants.

Estimated tuition and fees: mstc.edu/programcosts

ACADEMIC ADVISOR
To schedule an appointment with an academic advisor, call 715.422.5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit mstc.edu/advising.

CHECKLIST:
This section will be completed when meeting with your academic advisor.

- FAFSA (www.fafsa.gov)
- Financial Aid Form(s)
  Form(s): __________________________
- Follow-Up Appointment:
  Where: __________________________
  When: __________________________
  With: __________________________
- Official Transcripts
  Mid-State Technical College
  Attention CPL Coordinator
  500 32nd Street North
  Wisconsin Rapids, WI 54494
- Other: __________________________
  __________________________
BACHELOR’S DEGREE OPTIONS
UW-River Falls
BS Sustainable Management
UW-Stout
BS Sustainable Management
For more information and additional opportunities, visit mstc.edu/

RENEWABLE ENERGY TECHNICIAN
ASSOCIATE IN APPLIED SCIENCE
ONLY 35 MORE CREDITS

HEATING, VENTILATION, AND AIR CONDITIONING
TECHNICAL DIPLOMA
ONLY 13 MORE CREDITS

CONSTRUCTION TRADES
TECHNICAL DIPLOMA
12 CREDITS

OTHER OPTIONS

APPRENTICESHIP OPPORTUNITIES
• Carpenter Apprenticeship
• Electrician Apprenticeship
• Plumber Apprenticeship
• Steamfitter Apprenticeship
• Steamfitter Service Apprenticeship

HIGH SCHOOL STUDENT
COLLEGE TRANSFER
RETURNING ADULT

BACHELOR’S DEGREE OPTIONS
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BS Sustainable Management
UW-Stout
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HIGH SCHOOL STUDENT
COLLEGE TRANSFER
RETURNING ADULT

BEGIN AT ANY POINT IN THE PATHWAY
PROGRAM OUTCOMES
Employers will expect you, as a Heating, Ventilation, and Air Conditioning (HVAC) graduate, to be able to:
• Join pipes or tubing to equipment and to fuel, water, or refrigerant source to form complete circuit.
• Test pipe or tubing joints or connections for leaks, using pressure gauge or soap-and-water solution.
• Lay out and connect electrical wiring between controls and equipment, according to wiring diagrams, using electrician’s hand tools.
• Install, connect, and adjust thermostats, humidistats, and timers using hand tools.
• Test electrical circuits or components for continuity using electrical test equipment.
• Repair or replace defective equipment, components, or wiring.
• Obtain and maintain required certifications.
• Install ductwork and test for leaks.
• Size and lay out ductwork.
• Comply with all applicable standards, policies, and procedures, including safety procedures and the maintenance of a clean work area.
• Inspect and test systems to verify system compliance with plans and specifications or to detect and locate malfunctions.

TECHNICAL SKILLS ATTAINMENT
The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure program outcomes attained by students. This requirement is called Technical Skills Attainment (TSA). The main objective of TSA is to ensure graduates have the technical skills needed by employers. Students are notified of TSA reporting in their final few courses of the program.

STUDENT HANDBOOK
Visit mstc.edu/studenthandbook to view Mid-State’s student handbook, which contains information about admissions, enrollment, appeals processes, services for people with disabilities, financial aid, graduation, privacy, Mid-State’s Student Code of Conduct, and technology.

GRADUATION REQUIREMENT
The GPS for Student Success course is required for all Mid-State students and must be completed prior to obtaining 12 credits. (Not counted in the total credit value for this program.)

GPS for Student Success
10890102 ...............................................................1 credit
Integrate necessary skills for student success by developing an academic plan, identifying interpersonal attributes for success, adopting efficient and effective learning strategies, and utilizing Mid-State resources, policies, and processes. This course must be completed prior to obtaining 12 credits and as a graduation requirement.

ADDITIONAL COURSES AS NEEDED
The following courses may be recommended or required if the student does not achieve minimum Accuplacer scores.

Intro to College Reading
10838104 .............................................................2 credits
Provides learners with the opportunities to develop and expand reading skills, including comprehension and vocabulary skills. Learners apply reading skills to academic tasks and read to acquire information from a variety of sources.

Intro to College Writing
10831103 ..............................................................3 credits
Introduces basic principles of composition, including organization, development, unity, and coherence in paragraphs and multi-paragraph documents. The purpose of this course is to prepare students for successful entry into required program courses. This course is tuition bearing and under certain circumstances may qualify for financial aid. This course cannot be used to satisfy program completion requirements at Mid-State.
Prerequisite: Accuplacer Sentence Skills score of 60 or equivalent. Proficiency in word processing skills recommended.

Pre-Algebra
10834109 .............................................................3 credits
Provides an introduction to algebra. Includes operations on real numbers, solving linear equations, percent and proportion, and an introduction to polynomials and statistics. Prepares students for elementary algebra and subsequent algebra-related courses.
Prerequisite: Accuplacer Math score of 65, Accuplacer Algebra score of 30, ABE Math Prep V 76854785 and ABE Math Prep VI 76854786 with a grade of “S.” (Note: ABE Math Prep V and VI courses cannot be used to satisfy program completion requirements at Mid-State.)
## SAMPLE FULL-TIME CURRICULUM OPTION

### Term 12 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10442100</td>
<td>Intro to Welding</td>
<td>1</td>
</tr>
<tr>
<td>10482107</td>
<td>Construction Fundamentals</td>
<td>2</td>
</tr>
<tr>
<td>10483121</td>
<td>Piping Applications</td>
<td>3</td>
</tr>
<tr>
<td>10601110</td>
<td>HVAC Heating Fundamentals</td>
<td>2</td>
</tr>
<tr>
<td>10601130</td>
<td>Blueprint Reading for Construction Trades</td>
<td>2</td>
</tr>
<tr>
<td>10601140</td>
<td>Electricity for the Construction Trades</td>
<td>2</td>
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### Term 13 credits

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<tr>
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<tbody>
<tr>
<td>10483110</td>
<td>Sustainable Heating System Design &amp; Installation</td>
<td>3</td>
</tr>
<tr>
<td>10483115</td>
<td>Energy Load Estimation and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>10483130</td>
<td>Electrical Controls &amp; Systems for Buildings</td>
<td>3</td>
</tr>
<tr>
<td>10601120</td>
<td>HVAC Air Conditioning Fundamentals</td>
<td>2</td>
</tr>
<tr>
<td>10601121</td>
<td>Intro to HVAC Installation</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total credits 25**

Please Note:
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## SAMPLE PART-TIME CURRICULUM OPTION

### Term 8 credits

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<td>10601110</td>
<td>HVAC Heating Fundamentals</td>
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</tr>
<tr>
<td>10601140</td>
<td>Electricity for the Construction Trades</td>
<td>2</td>
</tr>
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</table>

### Term 7 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10482107</td>
<td>Construction Fundamentals</td>
<td>2</td>
</tr>
<tr>
<td>10483110</td>
<td>Sustainable Heating System Design &amp; Installation</td>
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<tr>
<td>10601120</td>
<td>HVAC Air Conditioning Fundamentals</td>
<td>2</td>
</tr>
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### Term 5 credits

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<tbody>
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<td>Energy Load Estimation and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>10601130</td>
<td>Blueprint Reading for Construction Trades</td>
<td>2</td>
</tr>
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</table>

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<td>3</td>
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<td>10601121</td>
<td>Intro to HVAC Installation</td>
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### NOTES:

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888.575.6782 • Get the latest updates online at mstc.edu
Blueprint Reading for Construction Trades  
10601130 ..............................................................2 credits  
Develops the ability to read blueprints for commercial and non-commercial structures. Emphasizes blueprints drawn by licensed architects, covering plumbing, electrical wiring, structural framing, millwork, interior and exterior details, and basic information.

Construction Fundamentals  
10482107 ..............................................................2 credits  
Studies the concepts associated with the theory, materials, and methods used in construction, including footings and foundations, walls, floors, roofs and roof materials, exterior finishes, interior walls, ceiling and floor finishes, insulation types, vapor and air infiltration, and sound protection. Students also become familiar with blueprint reading and examine all trades associated with construction, including, electrical, HVAC, and plumbing. Safe use of the appropriate tools for each trade is covered.

Electrical Controls & Systems for Buildings  
10483130 ..............................................................3 credits  
Topics include an introduction to AC/DC electricity and the physical laws that apply to electronic circuits. Direct current (DC) covers basic definitions of voltage, current, and resistance and analysis of series and parallel resistive circuits. Alternating current (AC) includes an introduction to AC generation, capacitors, inductors, and transformers and their applications in electronic circuits. Additional topics include control circuits, symbols, diagrams, protection devices, relays, thermostats, single-phase motors, control components, and troubleshooting ACR system wiring diagrams.  
Corequisite: Electrical Circuits I 10605105 or Intro to Electronics 10605108 or Electricity for the Construction Trades 10601140

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Corequisite: Electrical Circuits I 10605105 or Intro to Electronics 10605108 or Electricity for the Construction Trades 10601140

Energy Load Estimation and Modeling  
10483115 ..............................................................3 credits  
In this course students will develop the skills to do residential and light commercial energy load estimations. Students will calculate heating and cooling building loads and estimate energy consumption rates and quantities. The student will also estimate energy upgrades such as insulation, window improvements, etc. and calculating payback and fuel savings. The course covers a variety of computer programs available for analyzing buildings.

HVAC Air Conditioning Fundamentals  
10601120 ..............................................................2 credits  
Topics include air conditioning principles and terms, physical principles of air movement, air filtering and humidity, and methods of conditioning air for comfort and health. Also covers the proper use of psychrometers, dry bulb thermometers, hygrometers, and reading and interpretation of psychrometric charts and scales as well as ASHRAE and BPI ventilation standards for residential units. (HVAC is a common industry reference to heating, ventilation, and air conditioning.)

HVAC Heating Fundamentals  
10601110 ..............................................................2 credits  
Provides an introduction to how homes and buildings are heated. Topics include introduction to heat principles, temperature measurement, fuels and other sources of heat, combustion, basic heating systems, basic furnace design, boiler design and operation, venting of furnaces, chimney or exhaust gases, and system controls. (HVAC is a common industry reference to heating, ventilation, and air conditioning.)

Intro to HVAC Installation  
10601121 ..............................................................2 credits  
Addresses residential and light commercial heating and cooling systems. Emphasizes the diversity of heating and cooling systems and how they operate. Students participate in the installation of a variety of HVAC systems and troubleshooting and service systems. (HVAC is a common industry reference to heating, ventilation, and air conditioning.)

Intro to Welding  
10442100 ..............................................................1 credit  
Builds knowledge of general welding shop procedures and safety, arc welding principles and equipment setup, and metal fabrication equipment use. Students work with a lab instructor to begin developing skills with the gas metal arc welding (GMAW) and gas tungsten arc welding (GTAW) welding processes by completing simple welding and fabricating tasks in preparation for further exploration in welding and fabricating.

Piping Applications  
10483121 ..............................................................3 credits  
Presents the fundamentals of plumbing and piping installation practices. Laboratory activities provide students with basic pipe joining processes associated with the plumbing and HVAC industries.

Sustainable Heating System Design & Installation  
10483110 ..............................................................3 credits  
Addresses solar thermal, geothermal, and biomass heating systems. Students participate in the installation and design of a solar hot water system. Topics include safety; system design and layout; component selection; mounting collectors; installing and insulating copper tubing; and installing a storage tank, heat exchanger, circulation pump, and other system components.