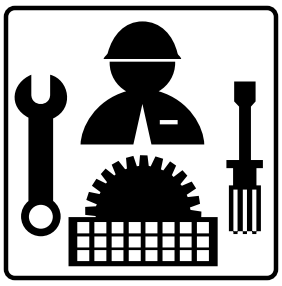


HEATING, VENTILATION, & AIR CONDITIONING (HVAC) INSTALLER

Technical Diploma
Program Code: 30-401-4
Total Credits: 24

Mid-State's Heating, Ventilation, & Air Conditioning (HVAC) Installer 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

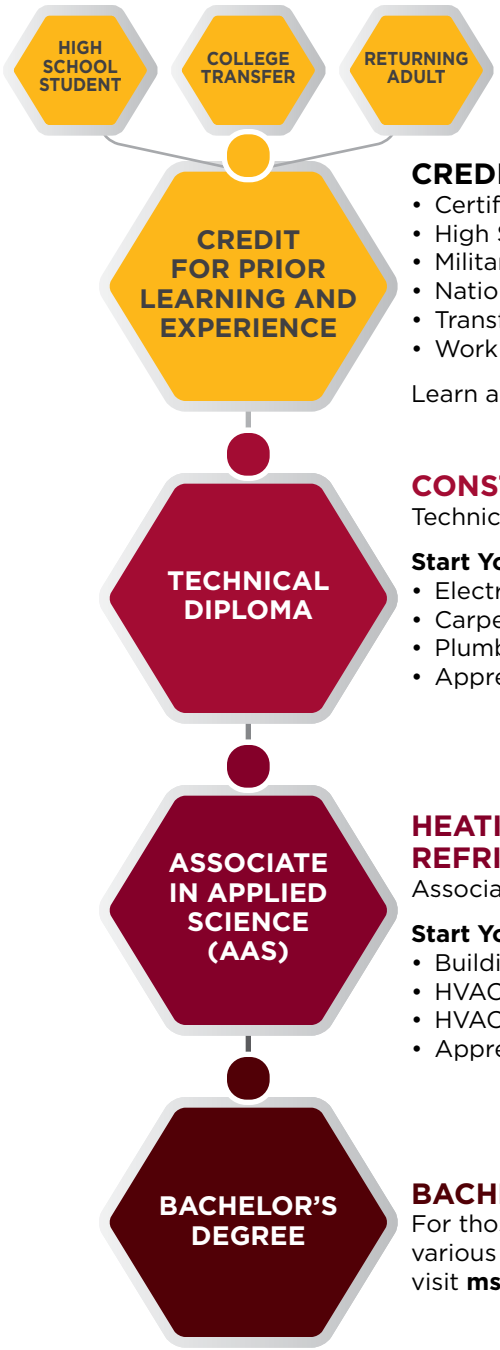
To schedule an appointment with an academic advisor, call 715.422.5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit **mstc.edu/advising**.

NEW STUDENT CHECKLIST

Complete the following steps to prepare for your New Student Advising appointment with your academic advisor:

- ❑ Submit a Mid-State application at **mstc.edu/apply**.
- ❑ Send official transcripts to:
  Mid-State Technical College
  Student Services
  1001 Centerpoint Drive
  Stevens Point, WI 54481
- ❑ Complete the Free Application for Federal Student Aid (FAFSA) at **fafsa.gov**. Mid-State's Financial Aid team is available to assist with your FAFSA application and to answer your financial aid questions. Contact Financial Aid or schedule an appointment at **mstc.edu/financial-aid**.
- ❑ Set up student MyCampus account at **mstc.edu/mycampus-assistance**.
- ❑ Schedule a New Student Advising appointment at **mstc.edu/advising**.

CAREER PATHWAY • BEGIN AT ANY POINT



CREDIT FOR PRIOR LEARNING AND EXPERIENCE

- Certifications and Licenses
- High School Credit
- Military Experience
- National/Standardized Exams
- Transfer Credit
- Work and Life Experience

Learn about Credit for Prior Learning at **mstc.edu/cpl**.

CONSTRUCTION TRADES

Technical Diploma • 10 Credits

Start Your Career

- Electrical Contracting Laborer
- Carpentry Contracting Laborer
- Plumbing Contracting Laborer
- Apprenticeship

HEATING, VENTILATION, & AIR CONDITIONING (HVAC) INSTALLER

Technical Diploma • 24 Credits

Start Your Career

- Heating, Ventilation, and Air Conditioning Installer
- Residential Heating, Ventilation and Air Conditioning Technician
- Heating, Ventilation and Air Conditioning Sales Representative
- Apprenticeship

HEATING, VENTILATION, AIR CONDITIONING, & REFRIGERATION (HVAC-R) TECHNICIAN

Associate in Applied Science (AAS) • 60 Credits

Start Your Career

- Building Control Technician
- HVAC-R Service Technician
- HVAC-R Project Manager
- Apprenticeship

BACHELOR'S DEGREE OPTIONS

For those interested in continuing their education, Mid-State offers transfer agreements with various four-year colleges and universities. For more information and additional opportunities, visit **mstc.edu/transfer**.

OTHER OPTIONS

APPRENTICESHIP OPPORTUNITIES

- Carpenter Apprenticeship
- Construction Electrician (ABC) Apprenticeship
- Construction Electrician (IBEW-NECA) Apprenticeship
- Plumber Apprenticeship
- Steamfitter and Steamfitter Service Apprenticeship

OUTCOMES

Employers will expect you, as a Heating, Ventilation, and Air Conditioning (HVAC) Installer graduate, to be able to:

- Maintain a safe and professional work environment when installing HVAC equipment.
- Plan the installation of a gas-fired furnace with a central air conditioning system.
- Install forced air ductwork.
- Commission an HVAC system.

TECHNICAL SKILLS ATTAINMENT

The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure 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 the Intro to HVAC Installation course.

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 program students and is recommended to be completed before obtaining 12 credits. (Not counted in the total credit value for this program.) Some students are exempt from this requirement. Please see your program advisor for more information.

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 is recommended to be completed prior to obtaining 12 credits and is a graduation requirement unless you receive an exemption from your program advisor.

ADDITIONAL COURSES AS NEEDED

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

College Reading and Writing 1
10831104 .....3 credits
Provides learners with opportunities to develop and expand reading and writing skills to prepare for college-level academic work. Students will employ critical reading strategies to improve comprehension, analysis, and retention of texts. Students will apply the writing process to produce well-developed, coherent, and unified written work.

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.

SAMPLE FULL-TIME CURRICULUM OPTION

Term		12 credits
10476171	Safety for Construction Trades ✎	1
10482107	Construction Fundamentals	2
10483123	Piping Installation	2
10601130	Blueprint Reading for Construction Trades	2
10601140	Electricity for the Construction Trades	2
10601150	Fundamentals of HVAC	2
31442320	Welding Foundations 1 ✎	1

Term		12 credits
10483102	Electrical Components & Control Circuits 1	2
10483113	Hydronics	3
10601110	HVAC Heating Fundamentals	2
10601121	Intro to HVAC Installation	2
10601123	Foundations of Air Conditioning and Refrigeration	3

Total credits 24

✎ This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at **mstc.edu/cpl** or contact your advisor for details.

Please Note:
- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Program completion time may vary based on student scheduling and course availability. For details, go to **mstc.edu/schedule**.

SAMPLE PART-TIME CURRICULUM OPTION

Term		6 credits
10483123	Piping Installation	2
10601140	Electricity for the Construction Trades	2
10601150	Fundamentals of HVAC	2

Term		6 credits
10476171	Safety for Construction Trades ✎	1
10482107	Construction Fundamentals	2
10601123	Foundations of Air Conditioning and Refrigeration	3

Term		5 credits
10601110	HVAC Heating Fundamentals	2
10601130	Blueprint Reading for Construction Trades	2
31442320	Welding Foundations 1 ✎	1

Term		7 credits
10483102	Electrical Components & Control Circuits 1	2
10483113	Hydronics	3
10601121	Intro to HVAC Installation	2

Total credits 24

NOTES:

COURSE DESCRIPTIONS

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 Components & Control Circuits 1
10482103.....2 credits
Topics include a review of AC/DC electricity fundamentals 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.
Prerequisite: Electrical Circuits I 10605105 or Electricity for the Construction Trades 10601140

Electricity for the Construction Trades
10601140.....2 credits
This course is an introduction to electrical theory and application for those in the construction and building trades. Content includes AC and DC circuits, schematics, Ohms law, multimeter use and circuit troubleshooting. This course will also provide an introduction to the contents of the National Electric Code (NEC).

Foundations of Air Conditioning and Refrigeration
10601123.....3 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.)

Fundamentals of HVAC
10601150.....2 credits
Designed to provide an understanding of the core principles that govern heating, ventilation, and air conditioning systems. Students will explore essential topics such as heat, temperature, and pressure, the relationship between matter and energy, and the importance of general safety practices in the field. The course will also cover the proper use of tools, instrumentation, and equipment commonly used the HVAC industry.

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.)

Hydronics
10483113.....3 credits
Students participate in the installation and design of a hydronic hot water and heat pump system. Topics include safety; system design and layout; component selection; mounting hydronic heat sources; installing distribution tubing; and installing heat emitters, air separator, circulation pumps, and other system components.
Prerequisite: Piping Installation 10483123

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 troubleshoot and service systems. (HVAC is a common industry reference to heating, ventilation, and air conditioning.)
Prerequisite: Piping Installation 10483123

Piping Installation
10483123.....2 credits
This course introduces students to the fundamentals of measuring, fitting, joining, and installing piping common to the plumbing and HVAC industries.

Safety for Construction Trades
10476171.....1 credit
The Safety for the Construction Trades course teaches construction related workers about their rights, employer responsibilities and how to identify, abate, avoid and prevent job related hazards. Students will familiarize themselves with the proper selection and use of personal protective equipment and safety requirements on a construction site for various activities. Course outcomes align with the training outcomes recommended by OSHA. Upon successful completion, students will receive an OSHA 10 Card.

Welding Foundations 1
31442320.....1 credit
An introductory welding course focusing on FCAW, GMAW and oxy-fuel cutting. Lecture and lab activities are designed to emphasize safe work habits.