HEATING, VENTILATION, AIR CONDITIONING, AND REFRIGERATION

Students in the Heating, Ventilation, Air-conditioning, and Refrigeration (HVACR) Program learn in modern, well-equipped labs. They are encouraged to use the labs in order to increase their hands-on-the-tools time and become proficient technicians. The labs are equipped with state-of-the art equipment including 2-stage split systems, 90% condensing furnaces, boilers, heat pumps, commercial ice machines, and roof top units. The foundation of the program is its emphasis on hands-on training. Faculty members include veteran teachers and industry professionals.

Accreditation

The boiler courses in the program are accredited by the National Association of Stationary Operating Engineers (NASOE).

The NASOE accreditation allows students to earn a 2nd class low pressure boiler operator license and a 3rd class stationary high-pressure steam engineer license. Students also have the opportunity to earn 3rd party credentials from HVAC Excellence and the North American Technician Excellence (NATE).

Entrance Requirements

None

Program Requirements

None

- Apply safety procedures from governing agencies associated with the HVAC industry.
- Test electrical circuits and components to determine their condition with the use of a multimeter.
- Read and utilize electrical diagrams to troubleshoot, rewire, and install HVAC equipment.
- Utilize the tools?of?the?trade to measure, cut, de?burr, bend, solder, and braze refrigeration line sets.
- Draw blueprints and construct sheet metal ductwork for residential and light commercial systems.
- Troubleshoot, maintain, and operate boilers and their controls.
- Demonstrate technical proficiency in the use of recovery machines, vacuum pumps, refrigerant manifold gauges as it applies to residential and light commercial air conditioning systems.
- Maintain maximum operating efficiency of heating and air conditioning systems by performing system analysis.
- Explain the use of valves and accessories used in the commercial refrigeration industry.
- Calculate the heat gain/loss and ventilation requirements of a structure.

Heating, Air Conditioning, and Refrigeration - Associate of Applied Science

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
Required Communications Course		3
	Total	**15.5**
Second Semester		
HAC 102	Air Conditioning & Refrigeration II	4
HAC 106	Advanced Heating Hydronics/Steam	3
HAC 115	Blueprint Reading for Heating & AC	3
HAC 208	Load Calculations & Duct Sys Design	4
Required Communications Course		3
	Total	**17**
Third Semester		
HAC 110	Heat Pumps & Electrical Heat	3
HAC 205	Commercial Air Conditioning	3
IST 110	Electrical Motor Control	3
ECS 110	Codes and Standards	3
Required Social/Behavioral Sciences Course		3
	Total	**15**
Fourth Semester		
HAC 104	HVACR Controls	3
ECS 103	Commercial/Industrial Boilers	3
ECS 112	Survey of Renewable Energy Systems	2
IMT 107	Technical Math I	4
Required Humanities/Fine Arts Course		3
	Total	**15**
	Program Total	**62.5**

Sheet Metal Mechanics - Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 114	Basic Electricity and HVACR Controls	3
HAC 109	Basic Sheet Metal	3
WEL 101	Welding I	2.5
HAC 115	Blueprint Reading for Heating & AC	3
HAC 116	Cost Estimating for Sheet Metal	3
HAC 104	HVACR Controls	3
	Total	**17.5**
Second Semester		
HAC 111	Commercial Sheet Metal	3
HAC 117	Architectural&Ornamental Sheet Metal	3
HAC 208	Load Calculations & Duct Sys Design	4
HAC 118	Testing & Balancing HVAC Equipment	3

WEL 102	Welding II	4
	Total	**17**
	Program Total	**34.5**

Light Commercial HVAC Service Tech - Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
	Total	**12.5**
Second Semester		
HAC 102	Air Conditioning & Refrigeration II	4
HAC 106	Advanced Heating Hydronics/Steam	3
HAC 115	Blueprint Reading for Heating & AC	3
HAC 208	Load Calculations & Duct Sys Design	4
	Total	**14**
Third Semester		
HAC 110	Heat Pumps & Electrical Heat	3
HAC 205	Commercial Air Conditioning	3
IST 110	Electrical Motor Control	3
ECS 110	Codes and Standards	3
	Total	**12**
	Program Total	**38.5**

Residential HVAC Service Technician - Basic Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
	Total	**12.5**
Second Semester		
HAC 102	Air Conditioning & Refrigeration II	4
HAC 106	Advanced Heating Hydronics/Steam	3
HAC 115	Blueprint Reading for Heating & AC	3
HAC 208	Load Calculations & Duct Sys Design	4
	Total	**14**
	Program Total	**26.5**

Residential HVAC Systems - Basic Vocational Specialist

Course	Title	Credits
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
Total Credit Hours		**12.5**

HVAC Facilities Maintenance Tech - Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
	Total	**12.5**
Second Semester		
HAC 102	Air Conditioning & Refrigeration II	4
HAC 106	Advanced Heating Hydronics/Steam	3
HAC 115	Blueprint Reading for Heating & AC	3
HAC 208	Load Calculations & Duct Sys Design	4
	Total	**14**
Third Semester		
HAC 110	Heat Pumps & Electrical Heat	3
HAC 205	Commercial Air Conditioning	3
IST 110	Electrical Motor Control	3
ECS 110	Codes and Standards	3
	Total	**12**
Fourth Semester		
HAC 104	HVACR Controls	3
ECS 103	Commercial/Industrial Boilers	3
ECS 112	Survey of Renewable Energy Systems	2
	Total	**8**
	Program Total	**46.5**

Refrigeration Service Technician - Basic Vocational Specialist

Course	Title	Credits
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
HAC 103	Basic Heating Gas/Oil	3
HAC 109	Basic Sheet Metal	3
HAC 119	Refrigerant Recovery Certification	0.5
HAC 207	Commercial Refrigeration	3
ECS 110	Codes and Standards	3
Total Credit Hours		**18.5**

Heating, Ventilation, Air Conditioning, and Refrigeration Courses

All HAC courses numbered 100 and above may be applied to the major field and elective requirement for the Associate in Arts and Associate in Science degrees.

HAC 101 Air Conditioning and Refrigeration I (3) 2,2
Emphasis on reducing emission of fully halogenated chlorofluorocarbon (CFC) refrigerants in refrigeration and air-conditioning equipment and application. Studies the compressor system used in mechanical refrigeration and air-conditioning. Covers the refrigeration cycle, compressors, receivers, evaporators, condensers, metering devices and refrigerants. Attention is given also to temperature conversions, absolute temperature, and gas laws. Introduces safe and efficient use of tools and torches in the installation of copper and steel piping. Refrigerant management, recovery, recycling and reclaiming will be covered to prepare the student for EPA technician certification. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer

HAC 102 Air Conditioning & Refrigeration II (4) 2,4
Continuation of HAC 101, emphasizing the construction of equipment, systems, controls and accessories found in refrigeration and air conditioning unit systems. Special emphasis is given to servicing, repair, testing, installation, charging, reading and wiring from ladder diagrams, and troubleshooting. Emphasis will also be placed on charging and working with non ozone depleting refrigerants.This course is repeatable 1 time. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Not Available.
In-District Tuition/Fees: $702 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: a) HAC 101; and b) HAC 119 or concurrent enrollment in HAC 119; and c) either HAC 114 or IST 105, or concurrent enrollment in either HAC 114 or IST 105; or d) consent of instructor
Semester(s) Offered: Fall, Spring and Summer

HAC 103 Basic Heating Gas/Oil (3) 2,2
Will cover the theory and fundamentals of heating and combustion. The course will cover the basic heating units of gas. The cleaning and servicing of them, and the control systems will also be covered. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in either HAC 114 or IST 105
Semester(s) Offered: Fall, Spring and Summer

HAC 104 HVACR Controls (3) 2,2
This course will cover the special controls used on commercial and industrial heating, air conditioning and refrigeration equipment. The operation, testing and servicing of these controls will also be covered. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $454 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 205 and IST 110 or consent of instructor
Semester(s) Offered: Fall and Spring

HAC 106 Advanced Heating Hydronics/Steam (3) 2,2
The theory and principles of steam, water piping, and their components will be covered. Boiler system operation, low pressure, pumps, controls, water treatment, accessories, service and preventive maintenance, heat load calculations will be covered. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 103
Semester(s) Offered: Fall and Spring

HAC 109 Basic Sheet Metal (3) 2,2
A basic course covering triangulation stresses and layout of sheet metal ducts and fittings. All layout will be done on paper in this course and then sample construction will be done in lab. This course is repeatable 1 time. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer

HAC 110 Heat Pumps & Electrical Heat (3) 2,2
Theory of refrigeration cycle with respect to heat pumps and electrical heat theory. Covers mechanical and electrical operation, service, repair, and proper installation. Also geothermal heat pumps will be covered. Students will also take the RSES National Certification Heat Pump course. Book can be purchased in the HVAC&R office. Certification is included in the cost of the textbook.This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Prerequisite:Grade of C or better in HAC 102 or concurrent enrollment in HAC 102 or consent of instructor.
Semester(s) Offered: Fall and Spring

HAC 111 Commercial Sheet Metal (3) 2,2
This course will cover advanced fitting layout, field measurements, advanced radial line developments and triangulation used in commercial construction of various duct fittings. Students will fabricate duct fittings for a particular project and will become responsible for their installation as well as installation of outdoor air and return air dampers for commercial units. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $489 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 109 and HAC 115
Semester(s) Offered: Varies

HAC 114 Basic Electricity and HVACR Controls (3) 2,2
A study of the electrical controls, electrical wiring diagrams and proper troubleshooting. Topics included are: electrical symbols, Ohms law, series and parallel circuits, power distribution, magnetism, switches, relays, AC current transformers, motor safety controls, capacitors and motors used in the HVACR field. Emphasis will be placed on reading and wiring up circuits from ladder wiring diagrams. The course will include the proper use of test instruments for troubleshooting. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer

HAC 115 Blueprint Reading for Heating & AC (3) 2,2
A thorough examination of the components and elements that make up an architectural set of blueprints, including floor plans, foundation, electrical, heating, and plumbing, elevations, details and sections, plot plan, door, window, finish schedules, and general specifications. Residential and light commercial construction will be studied. Intended for the public and tradespersons interested in the general field of architecture. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $454 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall and Spring

HAC 116 Cost Estimating for Sheet Metal (3) 2,2
Students will learn basic procedures of estimating in all facets of metal fabrication which will include: ductwork, electrical wiring, piping, insulation, VAV equipment, temperature controls, HVAC units, air distribution equipment, heat and cooling equipment, air pollution equipment, heat recovery equipment, stamping, welding, machining, steel fabrication, forging, plastics finishing, brazing, plating and painting. This course will cover principles, practices, and procedures and provide a cost-effective, step-by-step method for cost estimating. Emphasis will be placed on pitfalls, problems, mistakes, inaccuracies that can occur in cost estimates. Basic concepts and steps that are required to develop man-hour and material based cost estimates will also be covered. This course is repeatable 1 time; only three credits may apply toward a degree or certificate. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $454 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Varies

HAC 117 Architectural&Ornamental Sheet Metal (3) 2,2
This course will emphasize those sheet metal items and specialty items that can not be purchased from a manufacturer or supplier. Students will learn how to do repair or replacement work on architectural gutter and roofing. Due to OSHA laws emphasizing health and safety, students will learn to fabricate metal specialty items such as guards, machine guards, chutes, hoppers and other specialty items. Students will have the opportunity to experiment with a variety of styles of ornamental sheet metal items fabricated from copper and ornamental iron works with major emphasis on design, contour and mass. Students will concentrate on either architectural or ornamental fabrication for their final class project. This course is repeatable 1 time; only three credits may apply toward a degree or certificate.. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $489 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 109 and HAC 111 or concurrent enrollment in HAC 111
Semester(s) Offered: Fall and Spring

HAC 118 Testing & Balancing HVAC Equipment (3) 2,2
Students will study the most current procedures in testing, adjusting and balancing of air conditioning equipment. Topics which will be covered include use of instruments, preparing reports, balancing types of systems, equipment checkout, troubleshooting air problems, flow and pressure basics, balancing VAV systems, HVAC equipment, fans and drives, changing drives, grilles, diffuser and AK Areas will also be covered. Emphasis will be placed on balancing for energy conservation. Students will perform actual testing and balancing on HVAC equipment. Tjis course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $454 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 104 and HAC 208 or concurrent enrollment in HAC 208 Recommended: MTH 107
Semester(s) Offered: Varies

HAC 119 Refrigerant Recovery Certification (.5) .5,0
This course includes all information needed to prepare technicians to become certified to recover and contain refrigerant from both high and low pressure air conditioning and refrigeration equipment. This course is an EPA approved Refrigerant Certification course. This course is repeatable 3 times. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $94 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer

HAC 205 Commercial Air Conditioning (3) 2,2
The study of DX cooling, open and hermetic centrifugal liquid chillers, ventilation theory and application will be covered. Emphasis will be placed on both the electrical and mechanical aspects of the field. Proper maintenance and start-up procedures of chillers will be covered. Instruction will cover psychrometrics, capacity control, zone control, capacity control and economizers. Actual electrical wiring on DX cooling and chillers will be studied. The use of new refrigerants and guidelines for retrofitting will be covered both in the lecture and lab. Theory and installation of pneumatics and electronic control systems will be covered. This course is repeatable 1 time; only three credits may apply toward a degree or certificate. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 102 and HAC 119 or concurrent enrollment in HAC 119 or EPA refrigerant recovery certification
Semester(s) Offered: Fall and Spring

HAC 207 Commercial Refrigeration (3) 2,2
Study of high and low temperature applications and operations; mechanical and electrical components, service and repair, electrical circuitry, capacity control, and heat reclaim. Also covered are walk-in's, ice machines, and supermarket refrigeration equipment. This course is repeatable 1 time; only three credits may apply toward a degree or certificate. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $564 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 102 and HAC 119 or concurrent enrollment in HAC 119 or EPA refrigerant recovery certification
Semester(s) Offered: Fall and Spring

HAC 208 Load Calculations & Duct Sys Design (4) 4,0
Residential heating and cooling load calculations will be covered. The use of computer programs is also included. The student will also design a duct system for heating, cooling, and ventilation. This course is repeatable 1 time; only four credits may apply towards a degree or certificate. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $592 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 101, 102, 103, 106, 109, 114, 119
Semester(s) Offered: Fall and Spring

HAC 220 HVACR National Certification (1) 1,0
This course will include pre-training for the Industrial Competency Exam (ICE). The ICE exam is sponsored by the Air Conditioning and Refrigeration Institute (ARI)/ Gas Appliance Manufacturer's Association (GAMA). Three different exams are given at the end of the course which include Residential Air Conditioning and Heating, Light Commercial Air Conditioning and Heating, and Commercial Refrigeration.This course is repeatable 3 times; only one credit hour may apply toward a degree or certificate.. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $138 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 103 and HAC 110 or concurrent enrollment in HAC 103 and HAC 110
Semester(s) Offered: Varies

HAC 233 Special Topics in HVACR (.5) .25,.5
Designed to satisfy specific needs or interests of students and the community. The following guidelines are to be used in selecting topics: 1) Adequate and available material on specific topic; 2) Comprehensive outlines for each topic; and 3) Course should be designed to increase skill and knowledge in the field of heating, air conditioning, and refrigeration.This course is repeatable 3 times. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $69 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Varies

HAC 234 Special Topics in Heat/Air Cond. (1) .5,1
Designed to satisfy specific needs or interests of students and the community. The following guidelines are to be used in selecting topics: 1) Adequate and available material on specific topic; 2) Comprehensive outline for each topic; and 3) Course should be designed to increase skill and knowledge in the field of heating, air conditioning, and refrigeration.This course is repeatable 2 times. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $138 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Varies

HAC 235 Special Topics in Heat/Air Cond. (2) 1,2
Designed to satisfy specific needs or interests of students and the community. The following guidelines are to be used in selecting topics: 1) Adequate and available material on specific topic; 2) Comprehensive outline for each topic; and 3) Course should be designed to increase skill and knowledge in the field of heating, air conditioning, and refrigeration. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $276 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Varies

HAC 236 Special Topics in Heat/Air Cond. (3) 2,2
Designed to satisfy specific needs or interests of students and the community. The following guidelines are to be used in selecting topics: 1) Adequate and available material on specific topic; 2) Comprehensive outline for each topic; and 3) Course should be designed to increase skill and knowledge in the field of heating, air conditioning, and refrigeration. This course is repeatable 1 time. (1.2) Proficiency Credit Available Pass/No Credit Not Available.
In-District Tuition/Fees: $454 (effective 2025/26 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer