GREEN ENERGY TECHNOLOGY

The degree in energy management/renewable energy prepares students for work as mid-level technicians in the renewable energy industry. Students seeking this degree design, retrofit, test, balance, and troubleshoot environmental controls and renewable energy systems. The course of study includes work in the fields of solar heating, wind energy, solar electricity, and energy auditing. Students learn to evaluate energy management and renewable energy systems in both residential and commercial buildings. Students study ways to optimize existing residential and commercial building automation systems as well as new state-of-the-art systems. In addition to classroom study, students will perform energy audits and systems analysis on buildings located in the Elgin area. Faculty members include veteran teachers and industry professionals.

Accreditation

This program is accredited by the National Association of Stationary Operating Engineers (NASOE).

The NASOE accreditation allows students to earn a 3rd class stationary high-pressure steam engineer license. Students also have the opportunity to earn 3rd party credentials from HVAC Excellence.

Entrance Requirements

None

Program Requirements

None

Renewable Energy

- Evaluate the energy use patterns for residential and commercial structures and recommend energy efficiency and alternative energy solutions for optimization of evaluated buildings.
- Monitor the efficiency energy consuming systems, detecting, equipment failures, non standard operating conditions and opportunities for more efficient use of existing systems.
- Read and comprehend mechanical blueprints and control drawings.
- Program building automation systems for heating, ventilating, air conditioning, and exterior lighting service independently; and determine whether to dispatch appropriate staff or to resolve problems remotely via the energy management system.
- Assist in the writing of specifications for additional energy management systems. Including the use of renewable systems in tandem with traditional fossil fuel systems in order to optimize the energy utilization of the system.

Energy Management

- Evaluate the energy use patterns for residential and commercial structures and recommend energy efficiency and alternative energy solutions for optimization of evaluated buildings.
- Monitor the efficiency energy consuming systems, detecting, equipment failures, non standard operating conditions and opportunities for more efficient use of existing systems.
- Read and comprehend mechanical blueprints and control drawings.
- Program building automation systems for heating, ventilating, air conditioning, and exterior lighting service independently; and determine whether to dispatch appropriate staff or to resolve problems remotely via the energy management system.
- Assist in the writing of specifications for additional energy management systems. Including the use of renewable systems in tandem with traditional fossil fuel systems in order to optimize the energy utilization of the system.

Renewable Energy Option - 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
ECS 112	Survey of Renewable Energy Systems	2
ARM 105	Basic Electricity AC/DC	3
IMT 107 or MTH 112	Technical Math I or College Algebra	4
	Total	**15**
Second Semester		
HAC 103	Basic Heating Gas/Oil	3
HAC 102	Air Conditioning & Refrigeration II	4
ECS 202	Commercial Load Calculations	3
ARM 140	Programmable Controllers I	3
Required Communications Course		3
	Total	**16**
Third Semester		
HAC 110	Heat Pumps & Electrical Heat	3
ARM 142	Programmable Controllers II	3
ECS 116	Introduction to Wind Energy	3
ECS 111	Introduction to Photovoltaic Systems	3
ECS 117	Intro to Sustainable Heating Systems	3
Required Communications Course		3
	Total	**18**
Fourth Semester		
ARM 235	AC Drives	3
ECS 113	Energy Auditing	3
ECS 118	Photovoltaic System Application	3
ECS 119	Wind Turbine Service	3
Required Humanities/Fine Arts Course		3
Required Social/Behavioral Sciences Course		3
	Total	**18**
	Program Total	**67**

Energy Management - Associate of Applied Science

Course	Title	Credit Hours
Summer Semester		
CIS 110	Computer Concepts & Business Appls	3
	Total	**3**
First Semester		
HAC 103	Basic Heating Gas/Oil	3
HAC 101	Air Conditioning and Refrigeration I	3
HAC 104	HVACR Controls	3
ARM 105	Basic Electricity AC/DC	3
HAC 119	Refrigerant Recovery Certification	1.0
ARM 140	Programmable Controllers I	3
Select one of the following:		4
IMT 107	Technical Math I	
MTH 107	Technical Math I	
MTH 112	College Algebra	
	Total	**20**
Second Semester		
HAC 102	Air Conditioning & Refrigeration II	4
HAC 205	Commercial Air Conditioning	3
ECS 202	Commercial Load Calculations	3
ARM 142	Programmable Controllers II	3
Required Communications Course		3
	Total	**16**
Third Semester		
ARM 245	Advanced Programmable Controllers	3
ECS 206	Commercial Duct Design	3
ECS 108	Commercial Electronic Control System	3
ECS 110	Codes and Standards	3
ECS 114	IAQ for Commercial Buildings	3
Required Communications Course		3
	Total	**18**
Fourth Semester		
ARM 235	AC Drives	3
ECS 215	Commercial Applications Systems	3
Recommended Electives		3
Required Humanities/Fine Arts Course		3
Required Social/Behavioral Sciences Course		3
	Total	**15**
	Program Total	**72**

Recommended Electives

Course	Title	Credits
HAC 207	Commercial Refrigeration	3
HAC 236	Special Topics in Heat/Air Cond.	3
ECS 103	Commercial/Industrial Boilers	3
ECS 290	Energy Management Internship	2

Renewable Energy - Basic Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 103	Basic Heating Gas/Oil	3
ECS 117	Intro to Sustainable Heating Systems	3
HAC 114 or ARM 105	Basic Electricity and HVACR Controls or Basic Electricity AC/DC	3
HAC 119	Refrigerant Recovery Certification	1.0
ECS 112	Survey of Renewable Energy Systems	2
	Total	**15**
Second Semester		
ECS 111	Introduction to Photovoltaic Systems	3
ECS 116	Introduction to Wind Energy	3
ECS 113	Energy Auditing	3
ECS 202	Commercial Load Calculations	3
	Total	**12**
	Program Total	**27**

Energy Management - Vocational Specialist

Course	Title	Credit Hours
First Semester		
HAC 101	Air Conditioning and Refrigeration I	3
HAC 114	Basic Electricity and HVACR Controls	3
IST 140	Programmable Controllers I	3
ECS 117	Intro to Sustainable Heating Systems	3
IST 130	Basic Mechanical Drives	3
	Total	**15**
Second Semester		
IST 142	Programmable Controllers II	3
HAC 103	Basic Heating Gas/Oil	3
HAC 102	Air Conditioning & Refrigeration II	4
ECS 116	Introduction to Wind Energy	3
HAC 110	Heat Pumps & Electrical Heat	3
	Total	**16**
Third Semester		
IST 245	Advanced Programmable Controllers	3
ECS 202	Commercial Load Calculations	3
HAC 109	Basic Sheet Metal	3
	Total	**9**
	Program Total	**40**

Green Energy Technology Courses

All ECS 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.

ECS 103 Commercial/Industrial Boilers (3) 2,2
Provides a comprehensive study of all aspects of high pressure boilers. Contents include steam boiler operations, accessories, boiler operation safety, computer and programmable controls, water treatment, and testing. This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $479 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 106.
Semester(s) Offered: Fall and Spring

ECS 108 Commercial Electronic Control System (3) 2,2
This course is geared towards students and those individuals with some background in HVACR electronic controls. Emphasis is placed on function and application of HVACR electronic control systems. The subject material is structured for maximum participation in the interpretation of control sequences and selection of equipment. This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $479 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 104
Semester(s) Offered: Varies

ECS 110 Codes and Standards (3) 3,0
Familiarization with and identification of sources of current federal, state, local codes and standards (ASHRAE) applied to building, plumbing, electrical, heating, ventilation, refrigeration and air conditioning systems. (1.2) Proficiency Credit Available (2LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $444 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 101, HAC 103, HAC 109, and HAC 114, or consent of instructor Prerequisite: Grade of C or better in HAC 101, HAC 103, HAC 109, HAC 114, and HAC 119 or consent of instructor
Semester(s) Offered: Fall and Spring

ECS 111 Introduction to Photovoltaic Systems (3) 2,2
ECS-111 covers the fundamental principles, function, location, design, and application of modern Photovoltaic (PV) electric systems, with a strong emphasis on integrated Battery Energy Storage Systems (BESS). The course addresses the technical requirements for grid-tied, off-grid, and hybrid systems, focusing on component selection (e.g., high-efficiency modules, hybrid inverters), site safety, and compliance with the most current National Electrical Code (NEC) and energy standards (including NFPA 855 requirements for stationary storage. (1.2) Proficiency Credit Available (2 TIE) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall and Spring

ECS 112 Survey of Renewable Energy Systems (2) 1,2
A comprehensive overview of the modern clean energy sector, focusing on the business, technical, and regulatory landscape. The course explores established and emerging technologies, including solar PV, wind, and battery energy storage (BESS), and their role in grid modernization and business operations, including the electrification of the transportation sector. Emphasis is placed on current market drivers, project finance, policy frameworks (e.g., decarbonization goals, EV infrastructure planning, and practical case studies for professionals navigating the transition away from carbon-based energy sources. (1.2) Proficiency Credit Available (2 IT) Pass/No Credit Not Available.
In-District Tuition/Fees: $296 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall and Spring

ECS 113 Energy Auditing (3) 2,2
This course studies energy auditing for residential and light commercial structures including the purposes and limitations of three types of energy audits. Students will apply the theories learned in the classroom by performing a comprehensive energy audit on an existing structure. This course will provide hands on experience with the instrumentation necessary to perform an energy audit including: blower door testing, thermal imaging, and duct pressurization tests. (1.2) Proficiency Credit Available (3 MTESF) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: ECS 112 or consent of instructor
Semester(s) Offered: Fall and Spring

ECS 114 IAQ for Commercial Buildings (3) 3,0
This course covers IAQ problems that face building occupants and problems confronting building managers in buildings today. IAQ guidelines, EPA, OSHA, and other federal regulations will be covered as well as solving indoor air quality problems. This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $444 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 205
Semester(s) Offered: Varies

ECS 116 Introduction to Wind Energy (3) 2,2
Students will examine, operate, and evaluate a small wind powered electrical generation system. The course of study will include: installation and cost benefit analysis. The installation will include the use of standard hand tools and materials. The evaluation will include efficiency analysis calculations and the use of air flow and power measurement instruments. (1.2) Proficiency Credit Available (3 FMEST) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall and Spring

ECS 117 Intro to Sustainable Heating Systems (3) 2,2
Introduction to solar air heating using a combination of lecture, and fabrication lab sessions. Students will design, build and evaluate a solar air heating system. The design will include; material selection, heat transfer, and cost benefit analysis. The fabrication will include the use of standard hand tools and materials. The evaluation will include fundamental heat gain calculations and the use of air flow and temperature monitoring instruments. (1.2) Proficiency Credit Available (3 FMEST) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall and Spring

ECS 118 Photovoltaic System Application (3) 2,2
This course examines the advanced technical skills and knowledge necessary to work as a technician in the modern PV and distributed energy resource (DER) industry. Subjects addressed include current safety standards (NFPA 70/855), the complex interconnection of PV arrays with high-voltage battery storage (BESS), and the integration of Electric Vehicle (EV) charging infrastructure. The course focuses on the application, installation, commissioning, and advanced troubleshooting of hybrid PV systems that provide both utility-interactive and resilient off-grid power. (1.2) Proficiency Credit Available (3 TM) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in ECS 111
Semester(s) Offered: Fall and Spring

ECS 119 Wind Turbine Service (3) 2,2
This course examines the skills and knowledge necessary to work as a technician in the wind industry. Subjects addressed include safety training, the function and interrelation of the systems located in a wind power system. As well as a systems view of the propulsion and generation equipment typically located in a nacelle. The course will focus primarily on the production of electrical power following it from the wind turbine to the grid and finally to the end user. (1.2) Proficiency Credit Available (3 TM) Pass/No Credit Not Available.
In-District Tuition/Fees: $544 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in ECS 116
Semester(s) Offered: Spring

ECS 202 Commercial Load Calculations (3) 2,2
Provides a comprehensive study for heating and cooling load calculations for commercial buildings. Provides a wide range of procedures-both manual calculations procedures and computer-assisted. Emphasizes the Transfer Function Method (TFM) as a baseline procedure. CLTD/SCL/CLF are discussed. This course is repeatable 1 time (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $479 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 101 and HAC 103.
Semester(s) Offered: Fall and Spring

ECS 206 Commercial Duct Design (3) 2,2
A study in commercial duct design to provide the student a primer on the theory and on the factors that relate to designing low pressure, low velocity air distribution systems. Duct sizing methods will include equal friction method, static regain, constant velocity, velocity reduction, and modified equal friction. This course will also cover specific applications found in commercial and industrial buildings.This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $479 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in ECS 202 or concurrent enrollment in ECS 202
Semester(s) Offered: Varies

ECS 215 Commercial Applications Systems (3) 3,0
Students will use design procedure in selecting HVAC systems and performing the calculations and procedures that are required to size and locate the HVAC equipment and associated component for commercial buildings. Specifications of control and control cycles, layout, and designing of energy-efficient combination systems (heating and cooling) found in commercial and industrial buildings will also be covered. State-of-the-art equipment and control systems will be studied for maximum energy efficiency. This course bridges the gap between actual design and the theoretical knowledge. This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 LT) Pass/No Credit Not Available.
In-District Tuition/Fees: $464 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in ECS 110 and ECS 114 Recommended: MTH 112
Semester(s) Offered: Varies

ECS 290 Energy Management Internship (2) 0,0
This course will provide the student with the acquisition of practical experience through the application of classroom theories and concepts in actual industry settings under the supervision of faculty and organizational staff. This off-campus, field based course will provide broad exposure to the operating components of organizations employing energy management philosophies and strategies. Students will be required to work 160 hours in the field, communicate regularly with faculty, submit reports/journals, and keep a task log. (1.2) Proficiency Credit Not Available Pass/No Credit Not Available.
In-District Tuition/Fees: $296 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Consent of instructor/coordinator
Semester(s) Offered: Varies

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
This course introduces the fundamental principles and practices of mechanical refrigeration and air-conditioning systems. Students learn the full refrigeration cycle and study major system components, including compressors, condensers, evaporators, metering devices, receivers, and refrigerants. Core topics include temperature measurement and conversion, absolute temperature, and basic gas laws. Hands-on instruction emphasizes the safe and efficient use of tools, torches, and materials for installing copper. The course also focuses on proper refrigerant handling-recovery, recycling, reclaiming, and emission-reduction practices-to prepare students for EPA technician certification and responsible environmental stewardship. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Available.
In-District Tuition/Fees: $594 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 119 or concurrent enrollment in HAC 119.
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: $742 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 101, HAC 114, and HAC 119 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
This course introduces the fundamental principles of heating and combustion for gas and oil-fired systems. Students will study the operation of basic heating units, including their components, control systems, and common service requirements. Hands-on learning emphasizes proper cleaning, inspection, and routine maintenance procedures to ensure safe and efficient system performance. (1.2) This course is repeatable 1 time. Proficiency Credit Available (2 TSEI) Pass/No Credit Not Available.
In-District Tuition/Fees: $594 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Grade of C or better in HAC 114
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 (2 TSEI) Pass/No Credit Not Available.
In-District Tuition/Fees: $484 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 205 and IST ARM 110 or consent of instructor 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: $594 (effective 2026/27 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: $594 (effective 2026/27 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: $594 (effective 2026/27 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: $519 (effective 2026/27 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: $594 (effective 2026/27 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: $484 (effective 2026/27 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: $484 (effective 2026/27 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: $519 (effective 2026/27 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: $484 (effective 2026/27 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 (1) 1,0
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 (2 L) Pass/No Credit Not Available.
In-District Tuition/Fees: $173 (effective 2026/27 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 (2 TSEI) Pass/No Credit Not Available.
In-District Tuition/Fees: $594 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 102, HAC 103, and HAC 110. 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 (2 TSEI) Pass/No Credit Not Available.
In-District Tuition/Fees: $594 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 102 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. This course is repeatable 1 time. (1.2) Proficiency Credit Available (2 TSEI) Pass/No Credit Not Available.
In-District Tuition/Fees: $632 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: Effective Summer 2026 Prerequisite: Grade of C or better in HAC 101, and HAC 103, or instructor consent. 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: $148 (effective 2026/27 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: $74 (effective 2026/27 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: $148 (effective 2026/27 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: $296 (effective 2026/27 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: $484 (effective 2026/27 academic year)
In-district tuition rates are subject to change based on Board approval.
Prerequisite: None
Semester(s) Offered: Fall, Spring and Summer