

# HEATING, VENTILATION AND AIR CONDITIONING TECHNOLOGY (AS)

## Program Overview Associate in Science Degree



The Associate in Science Degree in Heating, Ventilation and Air Conditioning Technology (HVAC) is a comprehensive program designed to train students as entry-to-industry level technicians. The program offers a curriculum combining two distinct but interrelated areas dealing with heat energy and its transfer. The curriculum includes both the theoretical and practical aspects of heating and cooling.

The course content of the program includes the basic theory of heat flow and its control and the methods used to make heat flow to either cool or heat a specific area. Instruction in the refrigeration and air conditioning field begins with the basic domestic refrigerator and progresses to the most complex commercial refrigeration and air conditioning systems over the course of three ten-week terms. Topics in ground source geothermal and the use of heat pumps are also offered.

In the heating portion of the program (distributed over three terms), various heating systems are examined such as steam, warm air, and forced hot water. Also presented are the burners used in conjunction with these systems and their associated control circuitry. Special consideration is given to electrical wiring, heat loss calculations and system design as they relate to a residential and commercial application. Included in the Heating Program are courses in the installation of heating systems, gas technology, and introduction to welding.

All parts of the HVAC program contain intensive instruction in the mechanical and electrical control devices used in heating and cooling systems. Students receive comprehensive training in troubleshooting and service call procedures for both the heating and refrigeration/air conditioning portions of the program.

Graduates are prepared for positions as technicians in the refrigeration, air conditioning, and heating fields. In addition, graduates of this program are eligible to continue on for a Bachelor of Science degree in Business Management.

## Curriculum

Course	Title	Quarter Credit Hours
<b>Term I</b>		
AH 100	Introduction to the Professional Service Trades	3
AH 114	Refrigeration Systems Fundamentals	4
AH 116	Refrigeration Systems Fundamentals Lab	3
AH 125	Basic Electricity	2
AH 118	Basic Electricity Lab	2
OSH 010	OSHA Construction Safety & Health	2
<b>Quarter Credit Hours</b>		<b>16</b>
<b>Term II</b>		
AH 126	Electricity for Refrigeration & Air Conditioning	4
AH 128	Electricity for Refrigeration & Air Conditioning Lab	3
AH 212	Refrigeration Technician Certification	2
AH 214	Air Conditioning	3
AH 215	Air Conditioning Lab	3
<b>Quarter Credit Hours</b>		<b>15</b>
<b>Term III</b>		
AH 134	Commercial and Industrial Refrigeration	3
AH 138	Commercial and Industrial Refrigeration Lab	3
AH 140	System Electrical Controls I	1
AH 141	Systems Electrical Controls I Lab	1
Choose one of the following (depending upon Math Placement):		4-5
MA 105	Basic College Math with Lab (MA/SCI Core) <sup>1</sup>	
MA 110	Introduction to College Math	
<b>Quarter Credit Hours</b>		<b>12-13</b>
<b>Term IV</b>		
AH 144	System Electrical Controls II	2
AH 143	Systems Electrical Controls II Lab	1
AH 234	Modern Heating Systems	4
AH 235	Modern Heating Systems Lab	2
EN 100	Introduction to College Writing	4
Choose one of the following:		4
MA 121	Business Math	
MA 125	Technical Math I (MA/SCI Core) <sup>1</sup>	
MA 200	Applied Math for Business	
<b>Quarter Credit Hours</b>		<b>17</b>
<b>Term V</b>		
AH 238	Gas Heating Systems	4
AH 242	Gas Heating Systems Lab	3
AH 240	Blueprints, Pipe Fitting and Duct Layout	4
AH 241	Blueprints, Pipe Fitting and Duct Layout Lab	2
WEL 110	OFC/OAW, Electric Welding and Cutting	3
EN 200	Workplace Communications	4
<b>Quarter Credit Hours</b>		<b>20</b>

**Term VI**

SS 236	Small Business and the Law	4
Elective	100-200 Level Humanities Core <sup>1</sup>	4
Elective	100-200 Level Humanities Core <sup>1</sup>	4
Choose one of the following options:		7
Option 1		
AH 244	Oil Heating Systems	
AH 246	Oil Heating Systems Lab	
Option 2		
AH 250	Renewable Energy Systems	
AH 251	Renewable Energy Systems Lab	
<b>Quarter Credit Hours</b>		<b>19</b>
<b>Total Quarter Credit Hours</b>		<b>99-100</b>

<sup>1</sup> Liberal Arts Core.

## Legend

C = Number of lecture hours per week

L = Number of laboratory hours per week

T = Total Quarter Credit Hours where each lecture hour per week is one credit, every 2-4 laboratory hours are one credit depending on the expected amount of pre- or post-lab work.

All associate degree students are required to take 32 credits of liberal arts and math/science courses as selected from the liberal arts core. See the course descriptions section of this catalog for a list of the core area courses. Students who place out of MA 105 Basic College Math with Lab/MA 110 Introduction to College Math must still take 32 credits of core courses.

Subject to change.

## Program Mission, Goals, and Outcomes

### REFRIGERATION /AIR CONDITIONING DEPARTMENT

#### Program Mission

The mission of the Heating, Ventilation and Air Conditioning Technology program is to provide an associate degree program that will prepare students with entry-level skills in heating, refrigeration and air conditioning. The study of thermodynamics, through theory lessons and applied labs, will prepare the student for advancement through apprenticeship programs and continued education to qualify for HVAC license tests at state and federal levels.

#### Program Goals

1. To provide an appropriate learning environment to acquire theoretical knowledge, applicable hands on skills, and the interpersonal attributes to function as an entry level HVAC assistant.
2. To prepare students to qualify for testing in HVAC competency exams and certifications.
3. To encourage students to continue to gain additional educational knowledge and experience for a successful and rewarding career.

#### Program Outcomes

Graduates of the HVAC program will have acquired the skills to:

1. Take pressure and temperature readings with a manifold gauge set and various temperature meters.
2. Flare and braze copper tubing.
3. Diagnose various problems in an HVAC system using an electrical schematic diagram and various test meters.
4. Charge air conditioning and refrigeration systems with the proper refrigerants using manufacturer's instructions.
5. Identify components of air conditioning and refrigeration systems and explain their function.
6. Install and troubleshoot temperature, pressure and digital controls, including wi-fi to control residential and commercial air conditioning and refrigeration systems.

## HEATING DEPARTMENT

### Program Mission

The mission of the Heating Technology Program is to provide an integral component to the Associate Degree programs in Heating, Ventilation and Air-Conditioning Technology and Plumbing Heating Technology. The Heating Technology program is focused on providing basic essential training to students in preparation for their entry into the fields of oil and gas heating and pipefitting. This training is designed for those students who have recently graduated from high school as well as adults who are seeking a different career path to follow. Through a combination of classroom theory and hands-on laboratory training, students are given the opportunity to acquire the skills required for entry-level employment in the heating industry.

### Program Goals

The Heating Technology Program will provide the appropriate training for students to:

1. Develop theoretical knowledge of systems, their components and function.
2. Gain an understanding of tools and equipment used in the heating field and how to put them to proper use.
3. Use the knowledge acquired in the classroom and display proficiency in the lab while working on equipment readily found in real-life installations.
4. Qualify for the Rhode Island Oil Burner Journeyperson Technician's license.
5. Enter the workforce with the ability to interact appropriately with customers, vendors and fellow tradespersons.

### Program Outcomes

Graduates of this program will be able to:

1. Exhibit knowledge of combustion efficiency testing using instruments.
2. Demonstrate a procedure for testing electrical circuits by using a Volt-OHM-Milliamp Meter.
3. Calculate heat loss for a single-family dwelling and small commercial buildings and properly design a multi-zone series loop system for that structure.
4. Design a fuel delivery system with natural gas and propane for a residential and light commercial application and develop a complete parts list for the installation of that system in accordance with NFPA 54.

5. Install and troubleshoot heating controls for the following parameters: temperature, humidity, pressure and ventilation to create an efficient system.
6. Install furnaces and boilers with ductwork and piping.

## Q&A and Technical Standards

### Questions & Answers

#### 1. When do my classes meet?

Day Classes: Technical classes normally meet for at least three hours a day for up to five days a week. Classes normally begin in the early morning (7:45 a.m.), late morning (usually 11:25 a.m.), or mid-afternoon. The time slot for your program may vary from term to term.

Evening Classes: Technical classes meet on the average of three nights a week, although there may be times when they will meet four nights a week. Classes normally begin at 5:45 p.m.

In addition, to achieve your associate degree, you will take a total of approximately eight liberal arts courses, which will be scheduled around your technical schedule over the course of your entire program. Each liberal arts course meets approximately four hours per week. Liberal arts courses are offered days, evenings, and Saturdays.

At the beginning of each term you will receive a detailed schedule giving the exact time and location of all your classes. The university requires that all students be prepared to take classes and receive services at any of NEIT's locations where the appropriate classes and services are offered.

When a regularly scheduled class falls on a day which is an NEIT observed holiday (Columbus Day, Veterans Day, Martin Luther King, Jr. Day, and Memorial Day), an alternate class will be scheduled as a make up for that class. The make up class may fall on a Friday. It is the student's responsibility to take note of when and where classes are offered.

#### 2. How large will my classes be?

The average size for a class is about 20 to 25 students; however, larger and smaller classes occur from time to time.

#### 3. How much time will I spend in lab?

Almost half of your technical courses consist of laboratory work. In order for you to get the most out of your laboratory experiences, you will first receive a thorough explanation of the theory behind your lab work.

#### 4. Where do my classes meet?

Students should be prepared to attend classes at any of NEIT's classroom facilities: either at the Post Road, Access Road, or East Greenwich campus.

#### 5. I have not earned my high school diploma or GED: can I enroll in an Associate Degree Program?

A candidate for admission to an associate degree program must have a high school diploma, have earned a recognized equivalency diploma (GED), or meet the federal home school requirements.

#### 6. How long should it take me to complete my program?

To complete your degree requirements in the shortest possible time, you should take the courses outlined in the prescribed curriculum. This technology is a six-term curriculum, and a student may complete the requirements in as little as 18 months.

To complete all your degree requirements in the shortest time, you should take at least one liberal arts course each term.

Students may also elect to complete some of their liberal arts requirements during Intersession (except for EN courses), a five-week term scheduled between Spring and Summer Terms. Students will not be assessed any additional tuition for liberal arts courses taken during the Intersession but may be assessed applicable fees.

Students wishing to extend the number of terms needed to complete the required technical courses in their curriculum will be assessed additional tuition and fees.

#### 7. Is NEIT accredited?

NEIT is accredited by the New England Commission of Higher Education (NECHE). Accreditation by NECHE is recognized by the federal government and entitles NEIT to participate in federal financial aid programs. Some academic departments have specialized professional accreditations in addition to accreditation by NECHE. For more information on accreditation, see NEIT's catalog.

#### 8. Can I transfer the credits that I earn at NEIT to another college?

The transferability of a course is always up to the institution to which the student is transferring. Students interested in the transferability of their credits should contact the Office of Teaching and Learning for further information.

#### 9. Can I transfer credits earned at another college to NEIT?

Transfer credit for appropriate courses taken at an accredited institution will be considered upon receipt of an official transcript for any program, biology, science, and mathematics courses in which the student has earned a "C" or above within the past three years and for English or humanities courses in which the student has earned a "C" or above within the last ten years. An official transcript from the other institution must be received before the end of the first week of the term for transfer credit to be granted for courses to be taken during that term.

#### 10. What is the "Feinstein Enriching America" Program?

New England Institute of Technology is the proud recipient of a grant from the Feinstein Foundation. To satisfy the terms of the grant, the College has developed a one-credit community enrichment course which includes hands-on community enrichment projects. The course can be taken for a few hours per term, spread over several terms. Students who are already engaged in community enrichment on their own may be able to count that service towards course credit.

#### 11. How many credits do I need to acquire my Financial Aid?

In order to be eligible for the maximum financial aid award, you need to maintain at least 12 credits per academic term.

#### 12. What kind of employment assistance does NEIT offer?

The Career Services Office assists NEIT students and graduates in all aspects of the job search, including resume writing, interviewing skills, and developing a job search strategy. Upon completion of their program, graduates may submit a resume to the Career Services Office to be circulated to employers for employment opportunities in their fields. Employers regularly contact us about our graduates. In addition, our Career Services Office contacts employers to develop job leads. A strong relationship with employers exists as a result of our training students to meet the needs of industry. No school can, and NEIT does not, guarantee to its graduates employment or a specific starting salary.

#### 13. Where will job opportunities exist?

Graduates have obtained employment in the local area. However, one of the most exciting aspects of this program is the ability to look nationally for employment opportunities.

#### 14. Is there any state or federal licensing required in my field?

Because of the complex nature of state licensing requirements and because those requirements change periodically, NEIT cannot list all the requirements for the various types of licenses in the various states.

Under current Rhode Island law, a student who obtains an associate degree in heating, ventilation and air conditioning and thereafter registers with the Rhode Island Department of Labor and Training as an apprentice for at least three (3) years and is employed as a registered apprentice by a duly licensed pipefitter or refrigeration/air conditioning or fire protection sprinkler systems master or sheet metal contractor in Rhode Island for a period of three (3) years, may sit for the test for a journeyman's license in Rhode Island. (R.I.G.L. Section 28-27-11).

NEIT IS NOT RESPONSIBLE FOR ANY CHANGES IN LICENSING REQUIREMENTS THAT ANY STATE LEGISLATURE MAY IMPLEMENT AT ANY TIME, INCLUDING RHODE ISLAND.

#### 15. What kind of jobs will I be qualified to look for?

Heating, Ventilation and Air Conditioning graduates are qualified to work as an entry level heating, ventilation, and air conditioning technician salesperson, estimator, installer, engineer's assistant, counter person. In addition, jobs will exist in various aspects of oil and gas heating. Frequently, oil companies hire our graduates. Some jobs are also found with utility companies, plumbing/heating companies, or air conditioning/refrigeration/heating companies. Some of our past students have found excellent jobs as building maintenance supervisors in schools, hospitals, condominiums and office complexes. Your actual area of study and your individual strengths and interests will determine the job that is best suited for you.

## Technical Standards

These technical standards set forth by the Refrigeration/Air Conditioning, Heating and Plumbing Departments, establish the essential qualities considered necessary for students admitted to these programs to achieve the knowledge, skills and competencies to enter these fields. The successful student must possess the following skills and abilities or be able to demonstrate that they can complete the requirements of the program with or without reasonable accommodation, using some other combination of skills and abilities.

### Cognitive Ability

- Ability to deal with materials and problems such as organizing or reorganizing information.
- Ability to use abstractions in specific concrete situations.
- Ability to break information into its component parts.
- Ability to understand spatial relationships.
- Possession of basic math skills through addition, subtraction, multiplication and division of whole numbers and fractions using both the U.S. and Metric systems of measurement.
- Ability to demonstrate and use the knowledge acquired during the classroom training process and in the lab setting.

## Communications Skills

- Ability to communicate effectively with others including faculty and students.

## Adaptive Ability

- Ability to respond in an appropriate manner to stressful situations.
- Ability to maintain emotional stability and the maturity necessary to interact with other members of the faculty and students in a responsible manner.

## Physical Ability

- Ability to perform tasks requiring bending, stooping, squatting, kneeling, lying, climbing and walking.
- Ability to lift, lower, push, and pull using both arms and legs.
- Ability to grasp, lift and carry tools and equipment weighing fifty (50) pounds 50 - 500 feet from truck to work area.
- Ability to climb stairs and ladders to 25 feet.
- Agility and strength sufficient to allow bodily maneuvering in small spaces.
- Sufficient strength and agility to grasp and maintain tension for long periods of time.
- Ability to wear and tolerate ear plugs, safety glasses and other protective equipment.
- Ability to perform learned skills, independently, with accuracy and completeness within reasonable time frames in accordance with procedures.

## Manual Ability

- Sufficient manual dexterity and fine motor coordination to manipulate small objects within a limited space.
- Sufficient manual dexterity and motor coordination to coordinate hands, eyes and fingers in the operation of tools and other equipment.

## Sensory Ability

### Visual

- Acute enough to distinguish colors, read blueprints, inspect equipment for proper installation and work in dimly lit areas such as basements and boiler rooms.
- Acute enough to read small print.
- Acute enough to read small numbers on precision measuring instruments.

### Auditory

- Auditory ability, acute enough to detect sounds, changes in sounds, or lack of sounds emitted by heating and air-conditioning equipment.

## Degree Progress Checklist

### Heating, Ventilation and Air Conditioning Technology - AS

#### Degree Progress Checklists

- For students entering October 2024 or later
- For students entering April 2024 to September 2024
- For students entering October 2023 to March 2024
- For students entering January 2023 to September 2023



- For students entering April 2022 to December 2022
- For students entering April 2021 to March 2022
- For students entering April 2020 to March 2021