HVAC INSTALLATION & RESIDENTIAL SERVICE

Program Description
The HVAC Installation & Residential Servicing program provides graduates with the entry-level skills and theoretical knowledge needed to install and maintain the safe operation and energy efficiency of residential and light commercial heating, ventilation, and air conditioning systems.

Graduates typically secure jobs as residential, commercial or industrial installers, shop workers, erectors, and service technicians working for existing and new construction HVAC companies. Students learn blueprint reading, load calculations, warm air systems design, mechanical and fuel gas code knowledge, installation techniques, pattern development, and fabrication skills.

Students also learn how to service — troubleshoot and repair — residential and light commercial HVAC systems. In addition to field-related skills, students gain oral and written communication skills, advanced computation skills, customer relations, and critical thinking skills through Arts & Sciences and technical course work. A shorter certificate option is also available.

Dunwoody College of Technology: a non-profit, private technical college since 1914.

| Credential Earned | AAS Degree |
| Classes Offered | Day |
| Length of Program | 2 years (4 semesters) |
| Available Starts | Fall Semester; Spring Semester |
| Accreditation | HVAC Excellence |
| Further Study | Bachelor’s Completion Degree in Construction Management |

Degree Requirements
- **SERV1110** HVAC Electrical I
- **SERV1120** Heating Systems I
- **SERV1130** Residential Controls I
- **SERV1140** Basic Motor Technology
- **SERV1150** Cooling Systems I
- **SERV1210** Heating Systems II
- **SERV1220** Cooling Systems II
- **SERV1230** HVAC Electrical II
- **SERV1240** Heating Systems III
- **SERV1250** Cooling Systems III
- **HEAT1110** HVAC Ducts & Fittings
- **HEAT1120** Transitional Fittings
- **HEAT1130** HVAC Trunk-line Construction
- **HEAT1140** Fundamentals of Pattern Development
- **HEAT1150** Advanced Pattern Development
- **HEAT2210** Welding Fundamentals
- **HEAT2220** HVAC Design
- **HEAT2230** Residential HVAC Installation
- **HEAT2240** Commercial Blueprint Reading
- **MATH1050** Algebra, Trigonometry & Geometry
- **CHEM2000** Introduction to Chemistry
- **COMM1150** Interpersonal Communication
- **Diversity Elective**
- **Arts & Sciences Elective**

Salary Data
- **$53,130** Annual Average Salary

Placement Rate
- **100%**

Common Job Titles
- HVAC Installation Technician
- HVAC Service Technician
- Sheet Metal Fabricator
- Estimator/Sales
- Residential Systems Designer

Recent Employers
- Centraire Heating & Air Conditioning, Inc.
- B&D Plumbing, Heating & Air Conditioning
- Honeywell International, Inc.
- Standard Heating & Air Conditioning
- Local Union 10
- Midland Heating & Air

How to Apply
- dunwoody.edu
- 612.374.5800
- info@dunwoody.edu

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**Data reflects placement for AY2016-17 graduates indicating employment in their field of study within 6 months following graduation. Full data calculations are available for review during College open hours Monday through Friday 8 a.m. to 4 p.m. CT at Career Services or contact careerservices@dunwoody.edu.
AY2018-19 Revised: 6.25.18

Courses required for the HVAC Installation certificate
Course Descriptions

SERV1110 HVAC Electrical I, 2 cr.

SERV1120 Heating Systems I, 3 cr.
Basic fundamentals and terminology pertaining to heat transfer. Thermal environmental science properties. Latent and sensible heat, conduction, convection and radiation. Fundamental psychrometrics. Air distribution, room air movement characteristics and the fundamentals of balancing air systems. Analyzing static, velocity and total pressure along with airflow measurements within ductwork.

SERV1130 Residential Controls I, 2 cr.
Introduction to basic environmental controls with an emphasis on theory, application, and practical installation. Principles of Effective Temperature will be applied to various temperature, humidity, and air movement controls. Basic control of secondary circuits including transformers, relays, and contactors used in the operation of heating and cooling equipment. Sketch, diagram, and wire basic secondary control circuits. Job safety.

SERV1140 Basic Motor Technology, 3 cr.
Theory of magnetism and circuitry as it pertains to the induction motor. Introduction to fundamental types of motors used in the HVAC field. Wiring of various power and control circuits. Introduction to the relay, contactor and motor starter. Motor usage and service problems encountered in the field. Electrical diagramming and schematics. Troubleshooting motor circuits. Motor nomenclature and safety.

SERV1150 Cooling Systems I, 3 cr.
Basic fundamentals of cooling as it pertains to HVAC&R systems. Gas laws and the principles of the basic refrigeration cycle. Skills pertaining to refrigeration: tubing handling, flaring, swedging, soft and hard soldering and brazing. Introduction to refrigerants and refrigerant management.

SERV1210 Heating Systems II, 3 cr.
Heat generation as it pertains to residential furnaces. Natural and LP gases. Furnace types, sequence of operation, component identification, ignition types, test equipment and safety. Troubleshooting pertaining to the mechanical operation and the electrical control functions of gas furnaces. Diagnostic skills to meet service problems encountered in the field. Combustion testing and job safety.

SERV1220 Cooling Systems II, 3 cr.

SERV1230 HVAC Electrical II, 2 cr.
Introduction to semiconductors and elementary solid-state circuits used in HVACR control circuits. Electrical schematics for HVACR secondary and load circuitry. Fundamental operation and wiring of motor starter secondary and load circuits examined, diagrammed, and wired. Electronic theory applied to electronic air cleaners, electronically commutated motors, and digital temperature controls. Continued application of relays, and contactors developed in lab jobs and servicing situations encountered in the field. Job safety.

SERV1240 Heating Systems III, 2 cr.
Introduction to forced air, oil burning, and electric furnaces. Evaluation of gas, oil, and electric furnace sequences of operation coupled with combustion analysis. Practice of start-up procedures and combustion testing processes. Mechanical and electrical applications using wiring diagrams and schematics. Diagnostic skills of mechanical, combustion, and electrical problems encountered in the field. Job safety.

SERV1250 Cooling Systems III, 3 cr.
Advanced residential air conditioning and air-to-air heat pump systems. Theory and troubleshooting of heat pumps. Application and operation of air conditioning and heat pump controls examined. Wiring diagrams and schematics examined and evaluated. EPA and R-410a certification test review and exam. Introduction to customer relations skills with a focus on occupational professionalism. Job safety.

HEAT1110 HVAC Ducts & Fittings, 2 cr.
Development and fabrication of ducts and fittings common to the heating, ventilation, and air conditioning industry, with emphasis on uniform and state code requirements. Methods of connecting ducts and fittings in an air system. Principles of geometric pattern development as it applies to duct construction and application. Multiple uses and care of hand tools common to the industry.

HEAT1120 Transitional Fittings, 3 cr.
Focus on transitional fittings where the triangulation method of pattern development is required. Use of direct triangulation, as a short-cut method of layout, is emphasized. Identification, care, adjustment, and maintenance of floor equipment common to the sheet metal industry.

HEAT1130 HVAC Trunk-line Construction, 2 cr.
Pattern development, and the fabrication of a scaled-down trunk-line, emphasizing the quality and quantity of work. Usage, construction methods, and installation of various types of dampers.

HEAT1140 Fundamentals of Pattern Development, 3 cr.
Principles of pattern development as they apply to the layout of round fittings requiring parallel, or radial line methods of pattern development. Fabrication procedures for round fittings, including use of rotary machines for fabricating purposes, riveting, and spot welding. Use, safety, and proper procedures for soldering sheet metal are incorporated.

HEAT1150 Advanced Pattern Development, 3 cr.
Advanced theory and application of single, and double-line triangulation in the development of irregular patterns. Use of plan and elevation views in the visualization, and development of irregular objects as well as the procedure for the development of true-length lines seen in the foreshortened mode.

HEAT2210 Welding Fundamentals, 3 cr.

HEAT2220 HVAC Design, 2 cr.
Heat loss and heat gain energy calculation based upon Manual J Calculation. Development of the requirements for selecting and designing heating and cooling systems for residential construction. Operating characteristics, proper application, cost, advantages/disadvantages, and specific requirements for designing systems to meet specific needs.

HEAT2230 Residential HVAC Installation, 6 cr.
Installation procedures of residential and small commercial heating, ventilation, and air conditioning systems. Emphasis on the Uniform Mechanical code, and Minnesota State Mechanical, Fuel Gas, and Plumbing code, pertaining to heating, ventilation, and air conditioning installation procedures. Air-handling ducts, venting, combustion and fresh-air ducts requirements. Use of available standard-type fittings, sizing, cutting, and threading of gas pipe as well as installation and code requirements of residential-style gas systems. Installation, setup, and maintenance, of industries most common indoor air quality accessories is included.
Course Descriptions

HEAT2240 Commercial Blueprint Reading, 2 cr.
Architectural, structural, civil, electrical and mechanical blueprint reading with a major emphasis on heating, ventilation, and air conditioning systems contained within these plans. Duct construction, hangers and dampers evaluated according to specification and SMACNA requirements. Make drawings using AutoCAD: 2-D drafting commands for HVAC drafting.

MATH1050 Algebra, Trigonometry & Geometry, 3 cr.
Principles of algebra, geometry and trigonometry used in the context of a technical setting. Problem-solving strategies are developed and applied to technology.

COMM1150 Interpersonal Communication, 3 cr.
Analyze the process of interpersonal communication as a dynamic and complex system of interactions. Integrate interpersonal communication theory into work, family and social relationships. Apply fundamental tools needed to provide quality customer service. Decision making, problem solving, and managing customer service processes are emphasized.

MATH1050 Algebra, Trigonometry & Geometry
Principles of algebra, geometry and trigonometry used in the context of a technical setting. Problem-solving strategies are developed and applied to technology.

CHEM2000 Introduction to Chemistry, 3 cr.
Examine contemporary applications of chemistry in such areas as energy, technology and materials, pollution and waste. Applications illustrate many fundamental concepts in chemistry, such as molecular and electronic structure, mixtures, intermolecular forces, phase behavior, thermodynamics, electrochemistry, kinetics, and equilibria. Current and future global challenges are presented and discussed.

COMM1150 Interpersonal Communication
Analyze the process of interpersonal communication as a dynamic and complex system of interactions. Integrate interpersonal communication theory into work, family and social relationships. Apply fundamental tools needed to provide quality customer service. Decision making, problem solving, and managing customer service processes are emphasized.