**HVACR SYSTEMS SERVICING**

### Program Description

The HVACR Systems Servicing program prepares graduates to secure employment as technicians who maintain the safe operation and energy efficiency of residential, light and large-scale commercial and industrial Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) systems. Modern HVACR systems consist of multiple mechanical, electrical, energy management, and electronic components to operate and drive the equipment. Students learn the skills and theoretical knowledge needed to maintain these operating systems as well as troubleshoot, diagnose, and correctly repair environmental and product cooling 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.

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

### Degree Requirements

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### 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

### Common Job Titles

- HVAC&R Service Technician
- Building Engineer
- Pipefitter
- Refrigeration Mechanic
- R&D Technician

### Recent Employers

- Sedgwick Heating & Air Conditioning
- General Mills
- South-Town Refrigeration
- Minneapolis Pipefitters Local 539
- Zero Zone, Inc.

### Salary Data

- **Salary:** $50,420
- **Placement Rate:** 100%
- **Annual Average Salary**

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** Data reflects placement for AY2013-14 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.

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Course Descriptions

SERV1110 HVAC Electrical I

SERV1120 Heating Systems I
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
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
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
Fundamentals of cooling as it pertains to the HVACR 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
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

SERV1230 HVAC Electrical II
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
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
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.

SERV2110 Domestic Refrigeration Service
The mechanical refrigeration cycle of domestic refrigeration equipment will be analyzed and serviced to provide optimum operation. Refrigeration system component installation, analysis, check-out, repairs and maintenance. System start-up. Internal and external control troubleshooting and analyzing. Operations of various control systems utilized in high temperature refrigeration. Job safety.

SERV2120 Commercial Refrigeration Service I
Air-cooled and water-cooled refrigeration systems. System component analysis, repair and replacement. Methods of defrost, system start up; internal and external control troubleshooting and analyzing; electrical and electronic-control systems. Mechanical refrigeration cycle troubleshooting. Job safety.

SERV2130 Commercial Refrigeration Service II
Process chilled water and supermarket systems control, operation and energy management. Safety, both personal and equipment. Daily operation and preventive maintenance. Hands-on analysis and replacement of refrigeration system components. Analyze refrigeration controls. Screw and centrifugal chiller operation leading to year-round system operation.

SERV2140 HVAC Control Concepts
Fundamentals of HVAC control. Formations including pneumatic, electric, electronic, DDC and building energy management systems as they pertain to troubleshooting. Application of control systems of individual room, zone air distribution, variable frequency drives, air handlers, chillers and boilers. Damper control including economizer cycles in conjunction with indoor air quality. Safety, both personal and equipment.

SERV2210 HVAC Systems Servicing I
Energy management systems. Interfacing HVAC air handlers with energy sources in heating and cooling modes. Psychrometrics, start up and operation of industrial burners and their controls. System fail safe parameters. Analyzing outdoor air control parameters coordinating between energy efficiencies and desirable indoor air qualities. Make up and exhaust systems. DX and chilled water systems and component operation check out, analysis, repair and replacement. Control modes of various HVAC functions. System start up and check out procedures. Gas and mechanical codes. Safety, both personal and equipment.

SERV2220 HVAC Systems Servicing II
Heat loss/heat gain calculations. Individual HVAC components sized and selected. Analysis of the control systems serving HVAC systems. Service and replacement/repair procedures for various ventilating and exhaust systems, and their requirements and controls. Make up air units, along with hands-on adjustment of these systems and their controls. Building codes are applied. Safety, both personal and equipment.

SERV2230 Building Systems Operations I
Layout and construction of common sheet metal components found in building HVAC&R systems. Retrofitting skills with a working knowledge of the Uniform Mechanical Code. Welding skills with a focus on oxyacetylene. Safety issues emphasized.

SERV2240 HVAC Systems Servicing III
Steam accessories and codes regulating them, with emphasis on the Minnesota Boiler Examination. Hands-on analyzing control systems serving these HVAC systems. Steam systems and components. Constant volume HVAC systems. Blowers, filters, cooling coils, heating coils, air blenders and mixing boxes. Energy management systems. Individual HVAC components sized and selected along with single line designs of constant volume and multi zone systems. Low and high pressure steam, boilers and their systems. Steam/ hot water fan coil units. Safety, both personal and equipment.
Course Descriptions

SERV2250 Building Systems Operations II
Start up, check out, troubleshoot, diagnose, repair and replace various HVAC wet and dry systems and components. Roof top unit (RTU) start up and check out. Final check outs of various systems used in commercial installations. Operational reports. Control systems. Energy management systems. Preventive maintenance schedules of HVAC equipment. Plumbing, fire-protection and snow melting systems analyzed. Safety, both personal and equipment.

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.

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.