

## Course Number and Title: AUT 201 Automotive HVAC

**Campus Location:**

Georgetown, Stanton

**Effective Date:**

2021-51

**Prerequisite:**

ENG 102 or concurrent, AUT 102, AUT 103, AUT 104 or concurrent

**Co-Requisites:**

None

**Course Credits and Hours:**

4.00 credits

2.00 lecture hours/week

5.00 lab hours/week

**Course Description:**

This course introduces automotive heating and air-conditioning systems' components, operations, and service procedures. Laboratory experience includes system evaluation, diagnosis, and repair.

**Required Text(s):**

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

**Additional Materials:**

Safety glasses

**Schedule Type:**

Classroom Course

**Disclaimer:**

None

**Core Course Performance Objectives (CCPOs):**

1. Analyze and repair various air-conditioning (A/C) systems. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)
2. Analyze and repair refrigeration system components. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)
3. Analyze and repair heating, ventilation, and engine cooling systems. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)
4. Analyze and repair HVAC operating systems and climate control types. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)
5. Perform recovery, recycling, and recharging of various refrigerant systems according to the United States Environmental Protection Agency (EPA). (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

**Measurable Performance Objectives (MPOs):**

Upon completion of this course, the student will:

1. Analyze and repair the various air-conditioning (A/C) systems.
  1. Identify and interpret heating and air conditioning problems to determine needed action.
  2. Research vehicle service information including vehicle service history, service precautions, and technical service bulletins; and adhere to simulated shop procedures.
  3. Conduct an A/C system performance test to identify potential problems.
  4. Diagnose abnormal operating noises in the A/C systems to determine needed action.
  5. Perform refrigerant identification and pressure testing using specified equipment.
  6. Leak test A/C system to determine needed repairs.
  7. Determine recommended oil and oil capacity and inspect oil condition.
  8. Using a scan tool, observe and record related HVAC data and trouble codes.
2. Analyze and repair refrigeration system components.
  1. Diagnose and service A/C compressor drive belts, pulleys, and tensioners.
  2. Diagnose and service A/C compressor clutch components including compressor clutch air gap to determine needed action.
  3. Perform A/C compressor removal and inspection.
  4. Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.
  5. Determine need for an additional A/C system filter, and determine needed action.
  6. Perform removal of A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves to determine needed action.
  7. Inspect for proper A/C condenser airflow.
  8. Perform removal of receiver/drier or accumulator/drier to determine needed action.
  9. Perform removal and service of expansion valve or orifice (expansion) tube.
  10. Inspect evaporator housing water drain to determine needed action.
  11. Determine and explain procedure to remove and reinstall the evaporator.
3. Analyze and repair heating, ventilation, and engine cooling systems.
  1. Inspect engine cooling and heater systems hoses and pipes to determine needed action.
  2. Inspect and test heater control valve(s) to determine needed action.
  3. Explain procedure to remove, inspect, reinstall, and/or replace heater core.
  4. Explain heating system operation and service.
4. Analyze and repair HVAC operating systems and automatic climate control types
  1. Test HVAC system blower motors, resistors, switches, relays, wiring, and protection devices to determine needed action.
  2. Diagnose HVAC system clutch control systems to determine needed action.
  3. Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system.
  4. Inspect and test HVAC system control panel assembly.
  5. Inspect and test HVAC system control cables, motors, and linkages.
  6. Inspect HVAC system ducts, doors, hoses, cabin filters, and outlets for proper operation.
  7. Identify the source of HVAC system odors.
  8. Check operation of automatic or semi-automatic HVAC control systems.
5. Perform recovery, recycling, and recharging of various refrigerant systems according to the United States Environmental Protection Agency (EPA).
  1. Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.
  2. Identify A/C system refrigerant; test for sealants; recover, evacuate, and charge A/C system; add refrigerant oil as required.
  3. Recycle, label, and store refrigerant.

**Evaluation Criteria/Policies:**

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

**Final Course Grade:**

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Summative - Minimum 2 Exams (equally weighted)	20%
Summative - Minimum 2 Quizzes (equally weighted)	20%
Summative/Formative – Minimum 5 Repair Order/Worksheets (equally weighted)	30%
Summative Assessments – Minimum 2 Practical Assessments (equally weighted)	30%
TOTAL	100%

**Core Curriculum Competencies (CCCs are the competencies every graduate will develop):**

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

**Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):**

1. Use appropriate automotive diagnostic and service equipment, hand tools, and precision measuring devices to determine and perform the proper repair as necessary.
2. Interpret automotive electronic service information, service manuals, and diagnostic charts.
3. Document service repair procedures that accurately reference the 3Cs.
  1. Customer complaint verification
  2. Correct the problem
  3. Complete the repair.
4. Employ proper automotive industry service facility safety practices.
5. Practice professional conduct as required in the automotive industry.

**Disabilities Support Statement:**

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.