

DIET 1040 Diesel Truck and Heavy Equipment HVAC Systems

Course Description

This course introduces systems used in medium/heavy duty trucks and heavy equipment. Classroom instruction on HVAC theory and operation along with local, state, and federal regulations are strongly emphasized. Topics include: HVAC safety, HVAC system theory and operation, A/C system component diagnosis and repair, HVAC system diagnosis and repair, HVAC operating systems and related controls, and refrigeration recovery, recycling, and handling procedures.

Credit Hours: 3

Prerequisites

None

Corequisites

DIET 1010;

AC System Component Diagnosis and Repair

1. Identify causes of temperature control problems in the A/C system; determine needed action P-1
2. Identify refrigerant and lubricant types and check for contamination; determine needed action P-1
3. Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action P-1
4. Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action P-1
5. Perform A/C system leak test: determine needed repairs P-1
6. Perform evacuation, recovery, and recharge of A/C system using appropriate equipment P-1
7. Identify contamination in the A/C system components; determine needed action P-3
8. Identify A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action P-1
9. Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices P-2
10. Inspect and replace A/C compressor drive belts, pulleys, and tensioners P-1
11. Perform adjustment of A/C belt tension and check alignment P-1
12. Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly P-2
13. Inspect and correct A/C compressor lubricant level
14. Inspect, test, or replace A/C compressor
15. Inspect, repair, or replace A/C compressor mountings and hardware P-2
16. Correct system lubricant level when replacing the evaporator, condenser, receiver/drier, or accumulator drier, and hoses P-1
17. Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action P-1
18. Inspect and test A/C system condenser; check for proper airflow and mountings; determine needed action
19. Inspect and replace receiver/drier or accumulator/drier P-1
20. Inspect and test cab/sleeper refrigerant solenoid and expansion valve(s) P-3
21. Check placement of thermal bulb (capillary tube) and determine needed action P-3
22. Perform removal and replacement of orifice tube P-1
23. Inspect and test cab/sleeper evaporator core; determine needed action P-3
24. Inspect, clean, or repair evaporator housing and water drain P-1
25. Inspect, service/replace evaporator air filter P-1
26. Identify and inspect A/C system service ports (gauge connections); determine needed action P-1
27. Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action P-2

Heating Ventilation and Air Conditioning HVAC Safety

1. Comply with personal and environmental safety practices associated with clothing, eye protection, hand protection, proper lifting practices, hand tools, power equipment, proper ventilation, and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations

HVAC Operating Systems and Related Controls

1. Identify causes of HVAC electrical control system problems, determine needed action P-1
2. Inspect and test HVAC blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action P-2
3. Inspect and test A/C compressor clutch relays, modules, wiring, sensors, switches, diodes, and protection devices; determine needed action P-2
4. Inspect and test A/C related electronic engine control systems; determine needed action P-2
5. Inspect and test engine cooling/condensor fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action P-3
6. Inspect and test electric actuator motors, relays, modules, switches, sensors, wiring, and protection devices; determine

needed action

7. Inspect and test HVAC system electrical/electronic control panel assemblies; determine needed action
8. Identify causes of HVAC air and mechanical control problems; determine needed action P-3
9. Inspect and test HVAC system air and mechanical control panel assemblies; determine needed action P-3
10. Inspect, test, and adjust HVAC system air and mechanical control cables and linkages; determine needed action P-3
11. Inspect and test HVAC system actuators and hoses; determine needed action P-3
12. Inspect, test, and adjust HVAC system ducts, doors, and outlets; determine needed action P-3

HVAC System Diagnosis

1. Identify causes of outlet air temperature control problems in the HVAC system; determine needed action P-1
2. Identify window fogging problems; determine needed action P-2
3. Perform engine cooling system tests for leaks, protection level, contamination, coolant level, coolant type, temperature, and conditioner concentration; determine needed action P-1
4. Inspect engine cooling and heating system hoses, lines, and clamps; determine needed action P-1
5. Inspect and test radiator, pressure cap, and coolant recovery system (surge tank); determine needed action P-1
6. Inspect water pump; determine needed action
7. Inspect and test thermostats, by-passes, housings, and seals; determine needed repairs P-2
8. Perform recovery, flushing, and refilling of cooling system with recommended coolant/additive package and then bleed cooling system P-1
9. Inspect thermostatic cooling fan system (hydrolic, pneumatic, and electronic) and fan shroud; replace as needed P-2
10. Inspect and test heating system coolant control valve(s) and manual shut-off valves; determine needed action P-2
11. Perform inspection and flushing of heater core; determine needed action P-3

HVAC System Theory and Operation

1. Verify the need for service or repair of HVAC systems based on unusual operating noises; determine needed action P-1
2. Verify the need for service or repair of HVAC systems based on unusual visual, smell, and touch conditions; determine needed action P-1
3. Identify system type and components (cycling clutch orifice tube - CCOT, expansion valve, etc.) and conduct performance tests to determine needed action P-1
4. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action

Refrigerant Recovery Recycling and Handling

1. Perform maintenance and verify correct operation of certified HVAC equipment P-1
2. Identify and recover A/C system refrigerant P-1
3. Demonstrate recycling or proper disposal of refrigerant P-1
4. Perform handling, labeling and storage of refrigerant P-1
5. Test recycled refrigerant for non-condensable gases P-1

Required Textbooks/Materials :

Heavy Duty Truck Systems 7th Edition
Sean Bennett
978-1-3377-8710-9
Cengage

Institutional Mission

Atlanta Technical College, a unit of the Technical College System of Georgia, provides lifelong educational opportunities and experiences through academic and innovative career preparation, service learning, and multiple program delivery modalities that lead to technical certificates, diplomas, and associate degrees and make student development and success possible in a competitive global economy

Required Technology

One of the following operating systems is required: Microsoft Windows OS (XP, Vista); Apple Mac OS X (10.0) or above; or Unix/Linux. Internet Access - DSL or cable is recommended. Recommended Software - Adobe Acrobat Reader; Macromedia Flash 7.0+; Macromedia: Shockwave; QuickTime; Windows Media

Blackboard

Once you have access to Blackboard you will be enrolled in the Student Learning Community Organization (SLC). The SLC offers Blackboard training and other valuable college resources.

[Select this link to review a Bb Orientation Video](#)

[Select this link to review the Bb Technical Support Guide](#)

Attendance

The educational programs at Atlanta Technical College reflect those requirements and standards that are necessary for future successful employment in business and industry. Employers expect their employees to be present and to be on time for work each and every day. Likewise, Atlanta Technical College expects each student to be present and to be on time each and every day for all classes. Absences prevent students from receiving full course benefits, disrupt orderly course progress, and diminish the quality of group interaction in class. The college considers both tardiness and early departure from class as

forms of absenteeism.

Instructors have both the right and the responsibility to develop reasonable attendance expectations appropriate to the type, level, delivery method, and frequency of class meetings for their courses; communicate the expectations to students clearly via their syllabi addenda; and apply the consequences of failing to meet the expectations fairly and consistently to all enrolled students.

Instructors are responsible for determining whether work missed may be made up, and any make-up work allowed is scheduled at the discretion of instructors. Procedures for make-up work are detailed in syllabi addenda.

Documented absences for military duty, observed religious holidays, judicial proceedings in response to a subpoena, summons for jury duty, or other court-ordered process which requires the attendance of the student at the judicial proceeding are excused. Students absent from class for any reason are still responsible for all work missed. Students should enroll only in those classes that they can reasonably expect to attend on a regular basis.

Students who stop attending classes without officially withdrawing from class risk earning a final grade of F. If a student does not officially withdraw the instructor may issue a final grade of F and the last date of attendance, which will be last day that the student attended class or participated in an academically related activity.

In the event of severe weather or other emergencies, students are expected to continue participating in learning activities via Blackboard, @student.atlantatech.edu email account, or other modality. Instructors provide information on their continuation of instruction plans in their syllabi addenda.

Failure to attend class the first week may result in students being turned in as no-shows. See No-Show Policy for further information.

Course Withdrawal

WITHDRAWING FROM CLASS(ES)

Withdrawals can jeopardize the student's current and future financial aid eligibility. Specifically, students must complete and pass 67% of all classes attempted. Each withdrawal W as well as grades of D, F, I, IP, WP, and WF counts against the student's completion rate. Also, if a student withdraws prior to the 60% point of the term, he/she could be required to repay at least a portion of the aid received for the semester. Consequently, it is imperative that students maintain their attendance (stay in class) or consistently log on to an online course to avoid jeopardizing eligibility for financial aid and having to repay funds. Students will be permitted to withdraw from their courses until the last day of class as published on the academic calendar as Classes End. The student will receive a grade of W should this occur prior to the 60% point in the semester/term, and a grade of WP (withdrawal passing) or WF (withdrawal failing) should this occur after the 60% point in the term. The grade will be determined based on the student's academic performance up to the time the student ceases to be enrolled. The last date of attendance will be recorded as the last day that the student attended class or participated in an academically related activity. Students who take hybrid or on-line courses must log-in to the courses according to the course syllabus to be counted "present" and receive credit for attendance. It is the responsibility of the student to know what each hybrid or on-line course requires. Any student reported as a "no-show" by an instructor will be administratively removed from that class and will not be eligible for reinstatement in the current semester. "No-shows" or withdrawals can jeopardize current and future financial aid eligibility.

STUDENT WITHDRAWAL PROCEDURE

Withdrawing before the 60% Withdrawal Deadline.

The sole responsibility to officially withdraw from the college or specific class(es) lies with the student. The withdrawal without academic penalty period begins the fourth day of each term. Students are not eligible for a refund when they withdraw from a class during the withdrawal time frame. Students may withdraw from classes and receive a grade of W during the first 60% of the academic term. A grade of W does not affect a student's semester or cumulative grade point average or academic standing. The dates are identified as the Withdrawal without academic penalty for each term on the Academic Calendar.

Withdrawing before the 60% withdrawal deadline can be done through the online student registration system; directions on how to use the registration system can be found on the Atlanta Technical College Website. Students can drop all but one class through the online registration system. To drop the last class students must contact the Office of Enrollment Services. Students can stop by the Office of Enrollment Services in the Student Success Center and complete an official withdrawal form, or they must submit an email to the ATCRegistrar@atlantatech.edu email account. This email must come from the student's Atlanta Technical College @student.Atlantatech.edu email account and contain the student's name, student identification number, the class, and course registration number (CRN). The Office of Enrollment Services will not process requests when students send the information from any other email account.

Withdrawing after the 60% Withdrawal Deadline

After the 60% withdrawal deadline, students may withdraw from classes until the last day of class as published on the academic calendar as Classes End. After the 60% withdrawal deadline, instructors must assign a grade of WP (withdrawal passing) or WF (withdrawal failing). Grades of WP and WF affect students' satisfactory academic progress for financial aid purposes. Grades of WF also affect students' academic standing. The instructor will calculate the withdrawal grade at the point they are notified that the student is requesting to be withdrawn from the class. Students who stop attending classes without officially withdrawing from class risk earning a final grade of F. If a student does not officially withdraw the instructor issue a final grade of F and the last date of attendance, which will be last day that the student attended class or participated in an academically related activity.

To withdraw after the 60% withdrawal deadline students can stop by the Office of Enrollment Services in the Student Success

Center and complete an official withdrawal form, or they must submit an email to the ATCRegistrar@atlantatech.edu email account. This email must come from the student's Atlanta Technical College @student.Atlantatech.edu email account and contain the student's name, student identification number, the class, and course registration number (CRN). The form will be submitted to an Enrollment Services Counselor who will contact the instructor and request the last date of attendance and a grade of WP or WF. Instructors will assign grades of WP if students are passing at the time of the withdrawal or grades of WF if students are failing at the time of withdrawal. Grades of WF are calculated into semester grade point averages as grades of F.

Grading Scale

Grade Numerical Equivalent A 90% - 100% B 80% - 89% C 70% - 79% D 60% - 69% F 0% - 59% NOTE: Consistent with state requirements, Atlanta Technical College requires a minimum of C for progressing from specified courses to more advanced courses. Additionally, Atlanta Technical College requires an average of 70% or a grade of C for students to receive credit for a course. (See Student Handbook). Other grades allowed by Atlanta Technical College include:

EX	Exempted by Examination	Not Computed
W	Withdrew	Not Computed (Only given before mid-semester)
WP	Withdrew Passing	Not Computed (Given after mid-semester)
WF	Withdrew Failing	Computed
TR	Transfer Credit	Not Computed
AU	Audited	Not Computed
S	Satisfactory	Not Computed
U	Unsatisfactory	Not Computed
I	Incomplete*	Not Computed

*Course requirements for removal of an incomplete must be satisfactorily completed prior to the following semester's mid-semester date.

Academic Integrity

TBD

Essential Workplace Skills

A Workplace Essential Skills grade will be given each semester for specified courses. The Workplace Essential Skills grade will not affect the academic grade point average (GPA) of a student; that is, Workplace Essential Skills grades remain separate from academic grades. Workplace Essential Skills grades will be reported each semester.

The Workplace Essential Skills program is designed to evaluate and encourage good work habits that ensure job retention and career advancement.

Employability skills refer to the basic academic, interpersonal, reasoning, problem solving skills, and Workplace Essential Skills that, when transferred to the occupational settings, facilitate job acquisition, retention, and advancement.

The Essential Workplace Skills:

1. Leadership
2. Communication
3. Organization
4. Productivity
5. Teamwork
6. Professionalism
7. Resourcefulness

Students of core and program courses will receive a Workplace Essential Skills grade. Instructors will give Workplace Essential Skills assignments throughout the semester. Workplace Essential Skills grades are optional for developmental courses and for grades of W, WF, or WP. Workplace Essential Skills grades will not be used for grades of AC, AU, EX, I, IP, or TR.

Approved Workplace Essential Skills Grades

3 = Exceeds Expectations

2 = Meets Expectations

1 = Needs Improvement

0 = Unacceptable

Learning Resources

The student is expected and encouraged to use the school library which is located on the main campus in building G. The library has media equipment for faculty and staff use for instructional purposes. There are over 130 computers, a multimedia

room equipped with audio and audiovisual resources, and printing, copying, faxing, and scanning services. Seating is available throughout the library along with study carrels, six study rooms for reserve, one conference room and a Digital Classroom used for class instruction. Atlanta Technical College's library operating hours are Monday-Thursday, 7:30 a.m. - 8:00 p.m.; Friday, 7:30 a.m. - 4:00 p.m. Students may use the library located at Atlanta Metropolitan State College, or any other library within their access, to gather further information about the topic under discussion in class, or about any topic of interest to the student. If a particular resource cannot be obtained at the ATC Library, a student may use the Interlibrary Loan (ILL) service to locate the item(s). This service borrows books, articles and other resources from other libraries within the region. The ILL form may be accessed via the webpage under the Library's home page. Students are also expected and encouraged to use available Internet resources, as well as relevant periodicals, books, and electronic resources. Most course textbooks may be checked out for a two-hour, in-house library use only.

Tutorial Support

Tutorial support is available by each instructor during designated office hours. Remediation/tutorial support may be teacher or student initiated depending on the student's progress. Several programs of study offer services through peer counselors and mentors. Atlanta Technical College also offers math, English, reading, and study skills tutorials through the Academic Success Center. Located in room 2118, the Learning Support Center provides an open study area, face-to-face tutorial, Internet access, and various tutorial computer software. Students may also find out how to access our 24/7 online tutorial programs by visiting the Academic Success Center. The Academic Success Center's operating hours are Monday-Thursday, 7:30 a.m. - 8:00 p.m.; Friday, 7:30a a.m. - 4:00 p.m.; Saturday, 9:00 a.m. - 1:00 p.m.

Financial Aid

Various forms of financial aid are available. Students whose last name begins with A-J should call 404. 225.4720, and students whose last name is K-Z should call 404.225.4717. The Financial Aid office is located in the Dennard Building, Room 125, and the phone number is 404.225.4716.

Non-Discrimination Policy

As set forth in its student catalog, Atlanta Technical College does not discriminate on the basis of race, color, national or ethnic origin, gender, religion, disability, age, political affiliation or belief, veteran status, or citizenship status (except in those special circumstances permitted or mandated by law). For further information regarding these laws (Title VI and IX) contact Mattie Goss, Director of Student Services, Special Needs and Equity, Academic and Student Affairs Division, Atlanta Technical College, Academic Building, Suite C1109B, 404.225.4446. Email: mgoss@atlantatech.edu. To request reasonable accommodations upon enrollment (Section 504/ADA), contact Mattie Goss, Director of Student Services, Special Needs and Equity, Atlanta Technical College, Academic and Student Affairs Division, Academic Building, Suite C1109B, 404.225.4446. Email: mgoss@atlantatech.edu. Faculty and staff with questions about equity or reasonable accommodations should contact Director, Human Resources, Cleveland Dennard Building, Suite 180A, Atlanta Technical College, 1560 Metropolitan Pkwy., SW, Atlanta Georgia 30310. hr@atlantatech.edu.

Warranty

Curriculum standards have been developed with direct involvement of business and industry. These standards serve as the industry-validated specifications for each occupational program. The TCSG guarantee to every one of our students is this: *If one of our graduates educated under a standard program or his/her employer finds that the graduate is deficient in one or more competencies as defined in the standards, the technical college will retrain the employee at no instructional cost to the employee or the employer. This guarantee is in effect for a period of two years after graduation.*

Accreditation

Atlanta Technical College is accredited by the Southern Association of Colleges and Schools and Commission on Colleges (SACSCOC).

Contingency Plan

All classes at Atlanta Technical College use the Blackboard Learning Management System which allows for the continuation of classes even if the school is closed due to inclement weather or any other reason. In the event of school closure, continue to work on your class through Blackboard and be sure to check your Blackboard course and student email for class information from your instructor.