

AIRC1010 Refrigeration Principles and Practices

Course Description

This course introduces the student to basic refrigeration system principles and practices. Topics include refrigeration tools, piping practices, service valves, leak testing, refrigerant recovery, recycling, and reclamation, evacuation, charging, and refrigeration safety.

Credit Hours

4

Prerequisites

None

Terms Offered

Every Fall and Spring

Outcomes

Piping Practices

- Define PVC, CPVC, cement, primer, ANSI, NPS (ANSI-B36.10) NPT (ANSI-B1.20.0), schedule
- Identify different types of pipe used in refrigeration
- List the defined procedures for installing a PVC fitting (cement)
- List the defined procedures for installing a CPVC fitting (cement)
- List the procedure for threading black iron pipe
- Demonstrate the ability to fabricate piping circuits (PVC/CPVC/iron)
- Define ARC tubing, O.D., I.D., tube wrench
- Identify different types of tubing used in refrigeration
- List the procedures for swaging soft copper (manual/mechanical)
- List the procedures for flaring soft copper (manual/mechanical)
- List the procedures for bending soft copper (manual/mechanical)
- Demonstrate the ability to fabricate tubing circuits
- Demonstrate the ability to swag soft copper using a swaging tool
- Demonstrate the ability to flare soft copper using a flaring tool
- Demonstrate the ability to bend soft copper using a hand bender
- Define front-seated, back-seated, soldering, brazing, flux, capillary action, fuel gas, MAPP, oxidizing flame, neutral flame
- List proper procedures for assembling air-fuel torch set
- List proper procedures for lighting an air-fuel torch
- List proper procedures for shutting down an air-fuel torch
- Demonstrate the ability to assemble an oxy-fuel torch set
- Demonstrate the ability to lighting an oxy-acetylene torch
- Demonstrate the ability to shutting down an oxy-acetylene torch
- Demonstrate the ability to braze tubing assemblies using an oxy-acetylene torch

Refrigeration Practices

- Define recovery, evacuating, charging
- List the steps for refrigerant recovery from a refrigeration system
- List the steps for evacuation of a refrigeration system
- List the steps for the refrigerant charging of a refrigeration system
- Demonstrate the ability to operate various types of leak detectors
- Demonstrate the procedures for locating refrigerant leaks

- Demonstrate the ability to connect a gauge manifold to utility equipment (recovery/evacuating/charging)
- Demonstrate the ability to connect a gauge manifold to an operating appliance
- Demonstrate the ability to route refrigerant through a gauge manifold
- Demonstrate refrigerant recovery from a refrigeration appliance using a refrigeration pump
- Demonstrate the ability to evacuate a refrigeration appliance using a vacuum pump
- Demonstrate the ability to charging a refrigeration appliance using a gauge manifold

Refrigeration Safety

- Define EPA, Section-608, DOT, tare weight
- Explain EPA Section-608 certification process
- Demonstrate safety procedures in the use of hand tools
- Demonstrate safety procedures in the use of power tools
- Demonstrate the ability to locate the hazards associated with PVC primer using a SDS
- Demonstrate the safety procedures in fabricating piping circuits (PVC/CPVC/iron)
- Demonstrate safety procedures in fabricating copper tubing circuits
- Demonstrate the ability to locate the hazards associated with vacuum pump oil using a SDS
- Demonstrate safety procedures in the use of refrigerant (recovering/recycling/evacuation/transferring)
- Demonstrate safety procedures in using torches (air fuel/oxy-acetylene)

Refrigeration Tools

- Define SAE, ASME, ISO, fasteners, mechanical advantage, torque, open-end, box-end
- Identify common hand tools used in the construction trades
- Identify common fasteners used in the construction trades
- Identify common drivers used in the construction trades (slotted, Phillips, Pozidriv, Robertson, Allen, Torx)
- Identify common power tools used in the construction trades
- Explain the proper use of common hand tools used in the construction trades
- Explain the proper use of common power tools used in the construction trades
- List the mechanical damage caused by improper hand tool use (adjustable pliers/adjustable wrenches/drivers)
- Define Schrader valve, service valves, service wrench, gauge manifold
- Identify common refrigeration hand tools
- Identify equipment used in refrigerant management (recovery/evacuating/charging)
- Draw a cutaway diagram of a gauge manifold
- Describe the use of a recovery tank, vacuum pump, refrigeration pump, refrigeration scale
- Draw the connections of a gauge manifold during a recovery procedure

Required Textbooks/Materials

Refrigeration & Air Condition Technology 7th Edition and Lab Book

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, Unix/Linux, or Chrome OS. 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. I

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

WITHDRAWAL POLICY

The sole responsibility to officially withdraw from any class(es) or the College lies with the student. The effective date of withdrawal is the date the student notifies the college of the withdrawal.

Students have the privilege of dropping a course during the first three instructional days of each semester, through their BANNERWEB account, without the drop becoming a part of your permanent academic record and without it affecting your financial aid.

Please remember, any amount charged against student financial aid (PELL/Scholarships...etc.) in the bookstore will be owed back to the College.

The following criteria has been established for students who elect to withdraw after the third day of classes:

- **Beginning the fourth day of the term and through 60% of the term**, students can withdraw from classes via their BANNERWEB account. Students who elect to withdraw during this period will receive a grade of "W" on the official academic record and will not receive a refund of applicable tuition and fees.
- **After the "W" (or 60%) through the end of the term (last day of class)**, students can withdraw from classes via their BANNERWEB account. Students who elect to withdraw during this period will receive a grade of "F" on the official academic record and will not receive a refund of applicable tuition and fees.
- Students are prohibited from withdrawing from any class(es) during final exam week.

Students who choose to not withdraw from classes will be classified as abandoning the course.

Abandoning a course instead of following official withdrawal procedures may result in a failing grade assigned by the instructor and financial aid adjustments to the student's account, if applicable.

HARDSHIP WITHDRAWAL

The intent of a "Hardship Withdrawal" is to remove the negative effect of absences that are beyond the control of the student - if those absences affected the student's ability to withdraw by the deadline or occurred after the posted withdrawal deadline.

The hardship withdrawal submission period opens after the W (or 60%) posted date. A hardship withdrawal, if approved, is defined as a withdrawal after the 60% deadline. A student may petition for a hardship withdrawal by submitting the "Hardship Withdraw Request Form" from the Office of the Registrar. Hardship withdrawals MUST be requested no later than the end of the following semester for which the withdrawal is requested.

- (e.g.- to submit a request for a Spring Semester course, the Office of the Registrar must receive the request no later than the last day of the Summer Semester).

Examples of a reason to submit a hardship withdrawal includes, but is not limited to, hospitalization of the student, death in the immediate family, or military duty. A request must include verifying documentation of the extenuating circumstances.

If a hardship withdrawal is requested/granted, it will include all classes for the given term. Only one hardship withdrawal is allowed per student while enrolled at ATC. The final decision as decided by the Office of Academic & Student Affairs regarding the hardship withdrawal is final and not subject to appeal.

Grading Scale

Grades are issued at the end of each semester. A grade of "C" or better is required for most programs in all classes for graduation. However, there are some programs that may require a "B" or better; therefore, it is recommended that students consult with their specific program advisor.

Grades	Numerical Equivalent	Grade Points
A	90-100	4
B	80-89	3
C	70-79	2
D	60-69	1
F	0-59	0

Other grades allowed by Atlanta Technical College include:

EX	Exempted by Examination	Not Computed
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W	Withdrew	Not Computed (Only Given Before 60% Deadline)
TR	Transfer Credit	Not Computed (Displayed as TRA, TRB, or TRC – See Below)
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-term date.

I Indicates that student has an "incomplete" but has satisfactorily completed a substantial portion of the course work. For NON-ACADEMIC reasons beyond their control, the student has not been able to complete some specific part or amount of the work required. An "I" must be satisfactorily changed to a letter grade by the midpoint of the next semester, or it will be changed to the grade of "F" by the Office of Enrollment Services. Students must get approval from the instructor prior to the end of the semester to be eligible for an "I" grade. No credit is given and no grade points are calculated.

IP Indicates that a course continues beyond the end of the semester. An "IP" must be satisfactorily changed to a letter grade by the midpoint of the next semester, or it will be changed to the grade of "F" by the Office of Enrollment Services. No Credit is given and no grade points are calculated.

W Students who withdraw before the 60% point of the semester receive a grade of "W" Withdrew. No credit is given and no grade points are calculated.

EXE Indicates that a student has exempted a course through examination or through the articulated Tech Prep programs. Credit is given but grade points are not calculated. Instructors must submit an Exemption Form to the Office of Enrollment Services to report an exemption.

EXP Indicates the student has been awarded transfer credit though essential learning/prior learning assessment

TR Indicates that a student has been awarded transfer credit from AP, CLEP or IB examinations.

TRA, TRB, TRC Indicates that a student has been awarded transfer credit from another institution. Credit is given but no grade points are calculated. If a student earns credit for a course taken at Atlanta Technical College for which transfer credit has been awarded, then the transfer credit will be deleted from the student's record.

TRM Indicates that a student has been awarded transfer credit from their military experience.

AC Indicates articulated credit earned by students as a part of formal articulation agreements.

AU Indicates an audited course. No grade is given, no credit hours are earned and grade points are not calculated. Auditing a course must be initiated during the registration process. Approval for an audit cannot be granted after participation in classroom instruction. Instructors must submit an Audit Form to the Office of Enrollment Services to report an audit. Audited classes are not eligible for financial aid.

Z indicates students whose academic performance was affected by the COVID-19 global pandemic. A grade of Z is the functional equivalent of a grade of W; the course in which a student received a Z grade does factor into total credit hours attempted for financial aid calculations but does not affect overall GPA.

Student Handbook

All policies and procedures are listed in the Student Handbook, including procedures for filing a grievance. Select this link to review the Student Handbook.

Academic Integrity

Academic integrity is expected at all times. Any student found to have engaged in academic misconduct such as cheating, plagiarism, or collusion is subject to disciplinary sanctions as outlined in the Student Code of Conduct detailed in the ATC Catalog and Student Handbook. https://atlantatech.edu/wp-content/uploads/Student-Handbook_081820.pdf

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

Bookstore

Most books and supplies are available at the college bookstore. Books may be purchased there or rented at a reduced rate: Atlanta Tech Bookstore

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 Academic Success 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, 9:00 a.m. - 8:00 p.m.; Friday, 9:00a.m. – 2:00 p.m.

Financial Aid

The Financial Aid office is located in the Dennard Building, Room 125, and the phone number is 404.225.4716. Financial Aid information, resources, and specialists are located on our Atlanta Tech website: Financial Aid.

To better serve our student population we now have the QLESS ticketing system. You may Join the Line to be assisted in person during operating hours or Schedule an Appointment during a set time and day with your assigned Financial Aid Specialist.

Select this link to join the line or schedule an appointment.

Select this link to learn more about QLESS.

For information about tuition & fees, refunds and payment plans visit The Office of Student Accounts.

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, Dean of Students, Academic Building, Suite C1109G, 404.225.4446. Email: mgoss@atlantatech.edu.

To request reasonable accommodations upon enrollment (Section 504/ADA), contact Kymberly Savage, Special Populations Resource Specialist at Atlanta Technical College, Academic and Student Affairs Division, Academic Building, Suite C1109A, 404.225.4441. Email ksavage@atlantatech.edu.

American with Disabilities Act

Atlanta Technical College strives to provide equal access to education for all students. Students with a documented disability are eligible to receive reasonable academic adjustments and auxiliary aids in the classroom and/or for testing at Atlanta Technical College once the appropriate documentation of the disability has been submitted to the Director of Student Services.

To request reasonable accommodations upon enrollment (Section 504/ADA), contact Kymberly Savage, Special Populations Resource Specialist at Atlanta Technical College, Academic and Student Affairs Division, Academic Building, Suite C1109A, 404.225.4441. Email ksavage@atlantatech.edu.

Special Populations

Special Populations services are available to meet the needs of qualifying students. Services include but are not limited to workshops and training on educational, employability, and life skills; institutional and community resources and referrals; and resource fairs. Special populations include:

1. Single Parents - Individual with custody of a minor child or children.
2. Single Pregnant Women.
3. Displaced Homemakers - Adults who have been dependent on the income of a family member and no longer supported by that income, have been performing unpaid labor in the home and as a result have diminished marketable skills, and have difficulty securing employment.
4. Economically Disadvantaged - Any student who is a Pell Grant recipient, or is receiving federal assistance such as Food Stamps and/or Medicaid.
5. Individuals with other barriers to educational achievement, including individuals with limited English proficiency.

Please complete the Special Populations form State Enrollment System Information Form if you would like more information on the types of services available and if you qualify.

The Atlanta Technical College Resource Accommodation Specialist is Kymberly Savage, Special Populations Resource Specialist at Atlanta Technical College, Academic and Student Affairs Division, Academic Building, Suite C1109A, 404.225.4441. Email ksavage@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 Commission on Colleges to award associate degrees, diplomas, and technical certificates of credit. The Southern Association of Colleges and Schools Commission on Colleges is located at 1866 Southern Lane, Decatur, GA 30033, 404.679.4500; website: <http://sacscoc.org/>. Inquiries to the Commission should relate only to the college's accreditation status and not to general admission information.

Continuation of Instruction 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.