



# Atlantic Technical College

## Air Cond., Refrigeration & Heating Technology Program Syllabus 2017-2018



**Instructor Name:** Mr. Youngblood & Mr. Blackford  
**Department Name:** Technical Trades  
**Office/Classroom Location:** Building #8, Room 186  
**Phone Number:** 754-321-5100  
**Email Address:** brian.youngblood@browardschools.com  
 james.blackfordIII@browardschools.com

**Instructor Office Hours:**  
**M-F:** 1:50 PM – 3:50 PM  
 (by appointment only)

<p><b>Student Hours:</b>  <b>Monday – Friday</b>          7:05 AM – 1:50 PM          (Adults)</p> <p>7:05 AM to 10:05 AM          (High School 11<sup>th</sup> Graders)</p> <p><b>Lunch:</b> 10:05 AM – 10:35 AM  <b>Break:</b> 10:35 AM – 10:50 AM</p> <p>10:50 AM to 1:50 PM          (High School 12<sup>th</sup> Graders)</p> <p><i>NOTE: All students are expected to be present during their entire scheduled class time(s). All classroom breaks will occur on an “as needed” basis. The wall clock in the classroom will serve as the official time.</i></p>	<p><b>Program Name:</b> Air Conditioning, Refrigeration and Heating Technology  <b>Career Cluster:</b> Architecture and Construction</p>		
	<b>OCPs</b>	<b>Course Number / Title</b>	<b>Course Length</b>
	A	ACR0041/Air Cond, Ref & Heat Helper	250 hours
B	ACR0043/Air Cond, Ref & Heat Mechanical Assistant	250 hours	
C	ACR0047/Air Cond, Ref & Heat Mechanical 1	250 hours	
D	ACR0049/Air Cond, Ref & Heat Mechanical 2	250 hours	
E	ACR0044/Air Cond, Ref & Heat Technician	<u>350 hours</u>	
			<b>1350 total hours</b> <i>(including summer)</i>

**Technical College Policy/Adult Student Attendance:**

- A student must be withdrawn after being absent for six (6) consecutive days.
- Two (2) additional absences may be allowed under certain circumstance with appropriate documentation.
- Please refer to the Student Handbook for postsecondary students.  
[http://www.atlantictechcenter.com/Portals/7/pdfs/2015BTC\\_Handbook\\_LR.pdf](http://www.atlantictechcenter.com/Portals/7/pdfs/2015BTC_Handbook_LR.pdf)

**Magnet High School/Attendance Policy:**  
 A student who has had at least five unexcused absences, or absences for which the reasons are unknown, within a calendar month, or 10 unexcused absences, or absences for which the reasons are unknown, within a 90-calendar-day period, may be exhibiting a pattern of non-attendance (F.S.1003.26 (1) (b)) and the School Board of Broward County, Policy 5.5.

<p><b>Required Book(s) and/or Online Access</b> Available for purchase at the ATC Bookstore:</p> <ul style="list-style-type: none"> <li>• Modern Refrigeration and Air Conditioning; 20<sup>th</sup> Edition</li> </ul>	<p><b>Required Materials/Supplies</b> Purchased from ATC Bookstore:</p> <ul style="list-style-type: none"> <li>• Safety glasses &amp; Computer Headset (optional)</li> </ul> <p>Not Purchased from ATC Bookstore:</p> <ul style="list-style-type: none"> <li>• Items to be covered throughout course</li> </ul>
<p><i>All required books &amp; most materials/supplies can be purchased from the school bookstore. Stop by during operational hours for pricing &amp; purchasing information.</i></p>	
<p><b>ADULT STUDENTS:</b> <i>All required books &amp; some materials/supplies can be purchased from the school bookstore. Stop by during operational hours for pricing &amp; purchasing information. All other required materials/ retail supplies not available at the bookstore need to be purchased elsewhere. All required books and required materials/retail supplies need to be obtained prior to the start of the program.</i></p> <p><b>HIGH SCHOOL STUDENTS:</b> <i>Students receive all required books and most of the required materials/supplies on loan. High School students are responsible for the care and return of all of the required books and required materials/supplies on loan and will be issued an obligation for damaged or missing books and/or materials/supplies. Some of the required materials/supplies can be purchased from the school bookstore. Stop by during operational hours for pricing &amp; purchasing information. All other required materials/retail supplies not available at the bookstore need to be purchased elsewhere.</i></p>	
<p><b>Grading System:</b></p> <p>A 90 - 100%</p> <p>B 80 - 89%</p> <p>C 70 - 79%</p> <p>D 60 - 69%</p> <p>F 0 - 59%</p> <p>I Incomplete</p>	<p><b>Additional Program Specific Grading Information:</b></p> <ul style="list-style-type: none"> <li>• Projects 25%</li> <li>• Tests/Quizzes 25%</li> <li>• Work Habits/Attend 25%</li> <li>• Class Participation 25%</li> </ul>
<p><b>Online Course Grading Policy:</b> Not Applicable</p>	
<p><b>View Your Grades:</b> <b>Grades can be viewed online by following the directions below:</b></p> <ol style="list-style-type: none"> <li>1. Go to <a href="https://browardfocus.com">https://browardfocus.com</a> (access FOCUS using Chrome, Firefox or Safari)</li> <li>2. Student ID which is on your student schedule.</li> <li>3. Passcode: Student's date of birth formatted as YYYYMMDD. <i>Four digits for the year, two digits for the month and two digits for the day.</i></li> </ol>	

**Class Room/Lab Rules:**

1. Students are expected to be in their seats and ready to work when the bell rings.
2. Students are required to adhere to the Code of Conduct at all times, as set forth by the School Administration and the Student Handbook.
3. Students are to show respect to other students and the teacher at all times.
4. Students are responsible to keep their personal belongings with them at all times.
5. All electronic devices must be silent and out of sight during instructional time. This includes cell phones, headphones, mp3 players, etc. The school and/or teacher are not responsible for lost or stolen devices/personal belongings of any kind.
6. Computer use is a privilege and should only be used for researching HVAC/R-related information and to complete required assignments / classwork.
7. Students are expected to always maintain a clean and neat work area.
8. Students must notify teacher, in advance, if planning to miss a portion of class time(s) for ANY reason.
9. Students shall familiarize themselves and adhere to all safety procedures as noted in the Classroom Safety Manual.
10. Students shall put Project Tags on the equipment that are working on.
11. Students must not work on other student's tagged equipment.
12. Students are not allowed to utilize hand or power tools without the instructor's permission or instruction.
13. Absolutely no fighting or horseplay of any kind.

**Industry Certification & State Credential Exam Costs:**

- EPA Section 608 (Type I, Type II, Type III, and/or Universal) - \$25
- EPA R-410a - \$25
- H.E.A.T (*for high school students only*) - \$15
- HVAC Excellence; Employment Ready (*for adults*): Air Conditioning; Commercial Air Conditioning; Commercial Refrigeration; Electrical; Electric Heat; Gas Heat; Heat Pump - \$15 each

*You may qualify for certification reimbursement of your exam cost(s) upon passing. Credential fees are subject to change.*

**Outstanding Student Recognition Information:**

A gold seal will be applied to a Program Completion Certificate or an Applied Technology Diploma if the student has earned a 3.5 GPA or higher in their Career and Technical Education (CTE) classes.

**Program Name:** Air Conditioning, Refrigeration & Heating Technology

**Course Number:** ACR0041

**Course Name:** Air Conditioning, Refrigeration & Heating Helper

**Occupational Completion Point:** A

**Intended Outcomes:**

- 01.0 Demonstrate the importance of health, safety and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 02.0 Identify, use and maintain the tools and tool accessories used in the heating, air-conditioning and refrigeration industry.
- 03.0 Demonstrate mathematics knowledge and skills.
- 04.0 Demonstrate a practical knowledge of basic electricity and of the electrical components of heating, air-conditioning and refrigeration equipment.
- 05.0 Troubleshoot heating, air-conditioning and refrigeration electrical control systems and their components.
- 06.0 Select and test electrical generation and distribution components for commercial heating and air conditioning systems.
- 07.0 Maintain, test and troubleshoot electrical motors and their components for commercial heating and air-conditioning systems.
- 08.0 Troubleshoot and wire electrical motors and their components.
- 09.0 Operate solid-state electronics as used in heating, air-conditioning and refrigeration systems.
- 10.0 Evaluate single-phase and three-phase power as used in heating, air-conditioning and refrigeration systems.
- 11.0 Explain the function of basic electronics.

**Course Number:** ACR0043

**Course Name:** Air Conditioning, Refrigeration & Heating Mechanic Assistant

**Occupational Completion Point:** B

**Intended Outcomes:**

- 12.0 Describe the history and concepts of heating, air-conditioning and refrigeration.
- 13.0 Explain the properties of matter and heat behavior.
- 14.0 Analyze fluids, pressures, refrigerants and related codes.
- 15.0 Evaluate heating, air-conditioning and refrigeration system components and accessories.
- 16.0 Select appropriate commercial compressors.
- 17.0 Test and adjust commercial evaporative condensers.
- 18.0 Maintain, test and troubleshoot commercial evaporators.
- 19.0 Fabricate and service the piping, tubing and fittings used in the heating, air-conditioning and refrigeration industry.

**Course Number:** ACR0047

**Course Name:** Air Conditioning, Refrigeration & Heating Mechanic 1

**Occupational Completion Point:** N/A (1st half of C is complete)

**Intended Outcomes:**

- 20.0 Identify basic principles of heating, air conditioning, refrigeration and ventilation piping sizing.
- 21.0 Utilize and operate mechanical refrigeration servicing and testing equipment.
- 22.0 Assist in the installation of a residential heating and air-conditioning system and determine start-up procedures.

- 23.0 Conduct start-up and check-out procedures for mechanical heating and air-conditioning systems.
- 24.0 Demonstrate a working knowledge of refrigerants and oils.
- 25.0 Conduct system startup and shutdown.
- 26.0 Explain the importance of employability and entrepreneurship skills.

**Course Number:** ACR0049

**Course Name:** Air Conditioning, Refrigeration & Heating Mechanic 2

**Occupational Completion Point:** C (2nd half of C is complete)

**Intended Outcomes:**

- 27.0 Use combustion-type heating servicing and testing equipment.
- 28.0 Troubleshoot combustion gas valves and regulators as used in heating, air-conditioning, refrigeration and ventilation systems.
- 29.0 Maintain, troubleshoot and repair commercial heating systems.
- 30.0 Explain how to install, maintain and repair heating, air-conditioning and refrigeration systems.
- 31.0 Demonstrate knowledge of retail refrigeration systems.
- 32.0 Demonstrate knowledge of commercial and industrial refrigeration systems.
- 33.0 Develop an understanding of hydronic systems.

**Course Number:** ACR0044

**Course Name:** Air Conditioning, Refrigeration & Heating Technician

**Occupational Completion Point:** D

**Intended Outcomes:**

- 34.0 Determine the properties of air.
- 35.0 Use a pressure enthalpy chart to diagram refrigerant cycles.
- 36.0 Explain the standards for and ways to measure indoor-air quality.
- 37.0 (Optional) Identify and understand pneumatic control systems for commercial heating and air-conditioning applications.
- 38.0 Develop an understanding of chilled systems.
- 39.0 (Optional) Maintain and repair thermal storage systems.
- 40.0 Read construction documents.
- 41.0 Interpret, use and modify construction drawings and specifications.
- 42.0 Design heating and cooling systems.
- 43.0 Maintain, troubleshoot and repair commercial heating and air-conditioning systems.
- 44.0 Calculate commercial heating and air-conditioning loads.
- 45.0 Install air distribution systems.
- 46.0 Evaluate commercial airside systems.
- 47.0 Balance an air distribution system.
- 48.0 Select energy conservation equipment.
- 49.0 Analyze building management systems.
- 50.0 Recommend alternative heating and cooling systems for various case studies.

The School Board of Broward County, Florida, prohibits any policy or procedure which results in discrimination on the basis of age, color, disability, gender identity, gender expression, national origin, marital status, race, religion, sex or sexual orientation. Individuals who wish to file a discrimination and/or harassment complaint may call the Director, Equal Education Opportunities/ADA Compliance Department at 754-321-2150 or Teletype Machine (TTY) 754-321-2158. Individuals with disabilities requesting accommodations under the Americans with Disabilities Act Amendments Act of 2008, (ADAAA) may call Equal Educational Opportunities/ADA Compliance Department at 754-321-2150 or Teletype Machine (TTY) 754-321-2158.