

Technical College of the Lowcountry  
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## **ACR 102 TOOLS AND SERVICE TECHNIQUES**

### **Course Description**

This course is a basic study of the use of tools and service equipment used in the installation and repair of HVAC equipment.

3 Cr (3 lect/pres, 0 lab, 0 other)

### **Course Focus**

The instructor will instruct the correct and safe use of tools and equipment used in the HVAC/R industry. The student will demonstrate proper use of the tools and equipment in the lab. The course outline will be chapters 4, 5, 6, 7, 8, 10 and 11.

### **Text and References**

Refrigeration and Air Conditioning Technology 7th. Edition, Whitman, Tomczyk, Johnson & Silberstein. Refrigeration and Air Conditioning Technology Lab manual 7th. Edition, Whitman, Tomczyk, Johnson & Silberstein. Publisher: Delmar Cengage Learning, Clifton Park,, NY.

#### **Book**

Published: 2012

ISBN 1111644470

#### **Lab Manual**

Published: 2012

ISBN: 111161189

### **Course Goals**

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives. (\*designates a CRUCIAL goal)

1. discuss work habits
2. articulate procedures for MSDS
3. demonstrate safe use of tools
4. adhere to DOT requirements
5. show proper handling of pressure vessels
6. understand substance abuse
7. \*address importance of GFCI
8. use safety equipment
9. wear appropriate clothing
10. categorize hand tools
11. practice good housekeeping practices in lab
12. explain compound gauges
13. identify recovery cylinders
14. describe vibration eliminators

15. cut copper tubing
16. cut iron pipe
17. bend copper tubing
18. make swage fitting
19. \*braze copper pipe
20. demonstrate making a flare joint
21. assemble iron pipe
22. show use of a threader
23. identify types of piping
24. perform system pump down
25. describe recovery methods
26. operate recovery equipment
27. change schrader core
28. perform pressure test
29. check for leaks
30. use micron gauge
31. evacuate with vacuum pump
32. measure a vacuum
33. replace schrader valves
34. repair refrigerant leak
- \*35. weigh refrigerant charge
36. identify refrigerant valves
37. perform moisture test
38. measure refrigerant pressures
39. explain gauge pressure
40. charge refrigerant system
41. disconnect refrigerant hoses
42. explain ozone depletion
43. achieve EPA requirements
44. address mixing refrigerants
45. flush dirty refrigerant system

### **Student Contributions**

The student is expected to be prepared for class and to be in class on time.

The student is required to observe and practice all safety rules.

The student will not be allowed in the lab with any type of open toe shoe. (flip flops etc.)

No cell phones are allowed to be used in the classroom or lab. This includes texting.

No recording of classes is allowed.

### **Course Evaluation**

There will be seven open book exams worth a maximum of 10 points.

There will be a lab exercise on brazing worth a maximum of 20 points.

There will be a lab exercise on evacuation and system charging worth a maximum of 20 points.

There will be a closed book final exam worth a maximum of 50 points.

### **Grading:**

90 - 100 A

80 - 89 B

70 - 79 C

60 - 69 D

0 - 59 F

**Course Schedule**

The class meets for 1 lecture/lab for 2.5 hours per week.

Approved by: *Kenneth Flick* Developed/Revised: 09-20-2012  
Ken Flick, Division Dean for Business/Industrial Divisions

## ADA STATEMENT

The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

## ACADEMIC MISCONDUCT

There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student's responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the *TCL Student Handbook*, the Division Office, and the Learning Resources Center.

## ATTENDANCE

The College's statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Students taking an online/internet class must sign in **and** communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Reinstatement requires the signature of the division dean.

In the event it becomes necessary for a student to withdraw from the course **OR if a student stops attending class, it is the student's responsibility to initiate and complete the necessary paperwork.** Withdrawing from class may have consequences associated with financial aid and time to completion.

When a student exceeds the allowed absences, the student is in violation of the attendance policy. The instructor **MUST** withdraw the student with a grade of "W", "WP", or "WF" depending on the date the student exceeded the allowed absences and the student's progress up to the last date of attendance

*or*

o under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.

Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.

- A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.

A copy of TCL's **STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL)** is on file in the Division Office and in the Learning Resources Center.

## HAZARDOUS WEATHER

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

**Emergency Text Message Alert**

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancelations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to [www.tcl.edu](http://www.tcl.edu). On the homepage, click on “emergency TextAlert at TCL” and fill out the form or go to [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)