



Technical College of the Lowcountry  
921 Ribaut Rd.  
Beaufort, SC 29901

John A. Chemsak  
Industrial Technology Divisions  
Building 15, Room 126  
843-525-8289  
[Jchemsak@tcl.edu](mailto:Jchemsak@tcl.edu)

## ACR 108 REFRIGERATION FUNDAMENTALS

### Course Description

This course is an introduction to the principles of refrigeration including physics of refrigeration, refrigerant cycle and system components.

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

### Course Focus

This course will start with laws of physics and refrigeration theory. The application stage will be performed in the lab. The course outline will be chapters 1, 2, 3 and 9.

### 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: 111164489

### 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. identify freezing point
2. identify boiling point
3. identify absolute zero
4. explain heat flow
5. describe methods of heat transfer
6. write sensible heat
7. write latent heat
8. determine specific heat
9. establish atmospheric pressure
10. define matter and heat
11. convert KW to BTU
12. relate A/C to human comfort

13. define refrigeration
14. discuss change of state
15. discuss evaporative cooling
16. discuss compression cycle
17. establish absolute pressure
18. calculate absolute pressure
19. define enthalpy
20. graph refrigerant cycle
21. describe press/enthalpy diagram
22. draw press/enthalpy diagram
23. explain ozone depletion
24. understand bubble point
25. understand dew point
26. understand refrigerant blends
27. explain refrigerant temperature glide
28. learn applications of alkylbenzene oil
29. learn applications of mineral oil
30. learn applications of polyolester oil
31. examine problems mixing refrigerants
32. evaluate inadequate ventilation
33. store safely refrigerant tanks
34. comprehend refrigerant 410A
35. measure gauge pressure
36. measure refrigerant R22 pressure
37. service R22 heat pump
38. measure refrigerant 410A pressure
39. service R410A heat pump
40. balance refrigerant charge
41. describe superheat test
42. analyze system performance
43. elaborate subcooling test
44. \*perform superheat test
45. \*perform subcooling test

### **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 four open book exams worth a maximum of 10 points.

There will be a lab exercise on superheat and subcooling worth a maximum of 30 points.

There will a final closed book exam worth a maximum of 60 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/presentation for 2.5 hours per week.

Approved: *Kenneth Flick*  
Ken Flick, Division Dean for Business/Industrial Technology

Developed/Revised: 9-21-2012

## 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* 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)