

Chattanooga State Community College
Chattanooga, Tennessee
Tennessee College of Applied Technology (TCAT)
Third Semester Syllabus of Three-Semester Course
VT-000- HVAC/R Technician

Instructor Information

Instructor Name:

Kyle Lee (Morning Instructor)
Houston Graham (Evening Instructor)

Class Room:

TCAT 2 (room 66)

Office:

TCAT 2 (room 66A) **Hours** 7:15 pm to 3:15 pm (Morning Instructor)
TCAT 2 (room 66A) **Hours** 3:15 pm to 11:15 pm (Evening Instructor)

Phone

423-697-3173 (Morning Instructor)
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Catalog Course Description:

A combination of classroom and shop learning experiences used in the air conditioning and refrigeration program, which includes mechanical theory application, operation, and maintenance of basic and advanced air conditioning/refrigeration systems. In addition, students learn about the different heating, gas, oil, electric, solar, and heat pump systems. Graduates find career opportunities as air conditioning/refrigeration technicians; sales, retail, and wholesale representatives; installers; maintenance and service; engineer helper; or operator. Full-time day and evening courses are available on the main campus.

Prerequisites:

1. Second semester syllabus must have been completed with at least a 70.
2. Mathematics for Air Conditioning and Refrigeration must be completed with a certificate.

Co-requisites:

None

Entry Level Standards:

COMPASS Diagnostic test is used for all programs except LPN, Medical Assistant, Surgical Technology and Massage Therapy, which require the college COMPASS Test and the Volkswagen Mechatronics Programs that require the ACT or College Compass Test.

Textbook/Materials:

Refrigeration and Air Conditioning Technology, Newest Edition Tomczyk. Publisher (Delmar Cengage Learning): eBook (see note below)

Practical Problems in Mathematics for Heating and Cooling Technicians, Newest Edition Russell DeVore. Publisher (Delmar Cengage Learning): eBook (see note below)

NOTE: Both books are included in the Cengage Unlimited 12 month Instant Access ISBN 9780357700013

Required Student Learning Outcomes:

Institutional Learning Objectives (ISLO)

[\(List of ISLOs\)](#)

1. Communication Skills (Written and Oral)
2. Critical Thinking Skills
3. Information Literacy
4. Global and Cultural Awareness
5. Quantitative Literacy
6. Work Ethic
7. Competence in a Specialty

Program Student Learning Outcomes (PSLO)

1. Demonstrate oral, written and electronic communication techniques including non-verbal skills to gather, express, and transfer information in communicating with others. (ISLO 1)
2. Identify, analyze, contrast and compare, and apply knowledge to solve problems and obtain solutions in practical situations within a specialty. (ISLO 2)
3. Demonstrate basic IT skills for research, communication and analysis of specialty specific problems. (ISLO 3)
4. Demonstrate fundamental knowledge of cross-cultural awareness as applied in a business or industrial setting. (ISLO 4)
5. Develop and apply practical knowledge, skills and abilities in a specialty that meets or exceeds industry standards. (ISLO 5)
6. Work in teams or groups, when appropriate, to achieve goals. (ISLO 6)
7. Correctly apply professional and ethical standards unique and normally encountered in a student's specialty. (ISLO 7)
8. Demonstrate punctual and consistent attendance. (ISLO 6)

Course Student Learning Outcomes (CSLO)

1. Demonstrate industry based punctuality, attendance, and shop maintenance. (PSLO5, 6, 7,8)
2. Develop a basic understanding of airflow measurements, distribution, and balancing in air conditioning systems.(PSLO1, 2, 3, 4, 5, 6)
3. Determine the concepts of, and the factors that go into, heat gain and heat loss calculations. (PSLO1, 2, 3, 5, 6)
4. Develop a basic understanding of air source heat pumps theory of operation, components, and proper usage. (PSLO1,2,3,4,5,6)

5. Obtain a basic understanding of geothermal heat pumps theory of operation and components.(PSLO1,2,3,4,5,6)
6. Complete the ESCO Institute heat pump certification exam.(PSLO1,2,3,4,5,6,7)

Learning Indicators:

The student's ability to demonstrate the following will be indicators of their success in achieving the program and course level, student learning outcomes.

1. Understand airflow, what affects it and what affect it has on the system. (CSLO 2, 3)
 - a. Identify the components that affect airflow
 - b. Understand the function of each component
 - c. Test airflow on a variety of units and duct systems using different types of airflow testing equipment.
 - d. List and understand all HVAC/R equipment that affects the condition of the air e. Complete chapters 34, 35, 36
2. Understand how to install HVAC/R equipment and duct work. (CSLO 2, 3)
 - a. Identify the components of each type of duct system and their application
 - b. Understand the function of each component
 - c. Identify the components necessary for the various types of equipment installation
 - d. Use proper terminology and list all components required to perform each type of installation.
 - e. Complete chapters 38, 37, 42
3. Use advanced trouble-shooting techniques for each HVACR system. (CSLO 2, 3, 4, 5, 6)
 - a. Use multi meters, gauges, thermometers and other HVAC/R specific testing instruments for advanced diagnostics
 - b. Identify fail components without the need for disassembly
 - c. Use proper terminology and list all information required to obtain a replacement part for each component
 - d. Complete chapters 40, 41
4. Understand the various types of heat pumps, their components and function. (CSLO 4, 5, 6)
 - a. Identify the components of the various types of heat pumps and their application b. Understand the function of each component
 - c. Test the components found in the various types of heat pumps
 - d. Use proper terminology and list all information required to obtain a replacement part for each component
 - e. Complete chapters 43, 44, Heat Pump Certification
5. Understand the different types of disposable appliances, their components and function. (CSLO 2, 3, 4, 5)
 - a. Identify the components found in the disposable appliances
 - b. Understand the function of each component
 - c. Test the components found in the disposable appliances
 - d. Use proper terminology and list all information required to obtain a replacement part for each component
 - e. Complete chapters 45
6. Understand room air conditioners, their components and function. (CSLO 2, 3, 4, 5)
 - a. Identify the components found in room air conditioners b. Understand the function of each component
 - c. Test the components of room air conditioners

- d. Use proper terminology and list all information required to obtain a replacement part for each component
- e. Complete chapter 46

Required Assessment:

Assessment Names and Descriptions:

1. **Safety Test:** Demonstrate the ability to assess a shop area for safety and emergency needs and apply safe working practices in the shop environment of the HVAC/R industry. (CSLO 1)
2. **Airflow: Chapter 37** Develop a basic understanding of airflow measurements, distribution, and balancing in air conditioning systems. (CSLO 2)
3. **Load Calculations: Chapter 42** Determine the concepts of, and the factors that go in to, heat-gain and heat loss calculations. (CSLO 2, 3)
4. **Air Source Heat Pumps: Chapter 43** Develop a basic understanding of air source heat pumps theory of operation, components, and working environments. (CSLO 4)
5. **Geothermal Heat Pumps: Chapter 44** Obtain a basic understanding of geothermal heat pumps theory of operation and components.(CSLO 4,5)
6. **Heat Pumps: HVAC Excellence** Complete the ESCO Institute heat pump certification exam. (CSLO 2, 3, 4, 5, 6)
7. **Electricity: HVAC Excellence** Complete the ESCO Institute electricity certification exam. (CSLO 2, 3, 4, 5, 6)
8. **Motors:** Chapter E15 Identify, correctly wire, and diagnose the various types of motors used in the heating, air conditioning, and refrigeration field. (CSLO 1, 7, 8)

CSLO/Assessment Alignment and grade distribution:

Assessment	CSLO	PSLO
Safety Test	CSLO 1	PSLO 6
Airflow	CSLO2	PSLO 1
Load Calculations	CSLO 2, 3	PSLO 2
Air Source Heat Pumps	CSLO 4	PSLO 3
Geothermal Heat Pumps	CSLO 4, 5	PSLO 4
Heat Pumps	CSLO 2, 3, 4, 5, 6	PSLO 5
Motors	CSLO 1, 7, 8	PSLO 7

Grade Distribution

ELearn Exams 40%

Review Questions 40%

HVAC Excellence Heat Pump Certification 5%

HVACR Excellence Electrical Certification 5%
Daily Participation and Attendance 10%

Grading Scale or Policy

Letter grades in the current catalog:

A = 90-100%

B = 80-89%

C = 70-79%

F = 69.99% or below

Instructor Policies

Instructor Policy 1

Cellphones or other media devices, not allowed in class at any time.

Instructor Policy 2

You must have a parking decal and student ID by the 6th day of class.

Instructor Policy 3

All books and tools located on book list and tool list are to be in class every day.

Instructor Policy 4

You will follow all Instructor, TCAT and Chattanooga State policies. Located in eLearn site.

College Policy Statements:

This class is governed by the policies and procedures stated in the current Chattanooga State Student Handbook. [College Policies](#).

TCAT Attendance Policies

TCAT programs are clock hour based and require students to complete (91%)* of the program clock hours with a grade of (A, B, or C)* to meet the "Satisfactory Academic Progress" and be eligible for graduation. Students who receive a grade of "F" for a semester will not receive any clock hour credit toward program completion. Students must complete 91% of the program clock hours and have a minimum cumulative grade point average of 2.0 to graduate. *some programs, because of state regulations and/or licensing requirements, exceed 91% attendance and define a passing grade as an "A" or "B." It is the student's responsibility for clocking in and out.

NOTE: Instructor reserves the right to modify this syllabus at any time with written notification to the students.

Last Updated: 06/15/2021 HJG