Chattanooga State Community College
Chattanooga, Tennessee
Tennessee College of Applied Technology (TCAT)
Second 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)
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TCAT 2 (room 66A) **Hours** 7:15 pm to 3:15 pm (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:

First semester syllabus must have been completed with at least a 70.

Co-requisites:

Mathematics for Air Conditioning and Refrigeration

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. (PSLO 5,6,7,8)
2. Define and identify the different types of evaporators used in heating, air conditioning, and refrigeration systems. (PSLO1,2,3,4,5,6,7)
3. Define and identify the different types of condensers used in heating, air conditioning, and refrigeration systems. (PSLO 1,2,3,4,5,6)
4. Understand the operations and identify the components used in icemaker systems. (PSLO 1,2,3,5,6)

5. Understand the operations and identify the components used in refrigeration systems. (PSLO 1,2,3,4,5,6,7)
6. Understand the operation and applications of the various types of heating equipment and fuels. (PSLO 1,2,3,4,5,6,7)
7. Complete the ESCO Institute gas certification exam.(PSLO 1,2,3,4,5,6,7)

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 the basic refrigeration components and their function. (CSLO 2,3)
   a) Identify the components of the basic refrigeration system
   b) Understand the function of each component
   c) Test the components of the basic refrigeration system
   d) Use proper terminology and list all information required to obtain a replacement part for each component
   e) Complete chapters 21, 22, 23, 24 and 25
   f) Understand the various refrigeration controls, their application and function. (CSLO 2, 3, 5)
   g) Identify the various refrigeration controls and their application
   h) Understand the function of each component
   i) Test the components of the various refrigeration controls
   j) Use proper terminology and list all information required to obtain a replacement part for each component
   k) Complete chapters 27
2. Understand the various types of ice machines, their components and function. (CSLO 2,3,4,5)
   a) Identify the components found in each type of ice machine
   b) Understand the function of each component
   c) Test the components of the ice machines
   d) Use proper terminology and list all information required to obtain a replacement part for each component
   e) Complete Chapters 29
3. Use advanced trouble-shooting techniques for each HVAC/R system. (CSLO 1,2,3,4,5,7)
   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 30
4. Understand the various types of electric heat, their application, components and function. (CSLO 6)
   a) Identify the components found in each type of electric heat and their application
   b) Understand the function of each component
   c) Test the components the various types of electric heat systems

d) Use proper terminology and list all information required to obtain a replacement part for each component
e) Complete chapters 30

5. Understand the various types of gas furnaces, their components and function. (CSLO 7)
   a) Identify the components of the basic refrigeration system
   b) Understand the function of each component
   c) Test the components of each gas furnace system
   d) Use proper terminology and list all information required to obtain a replacement part for each component
   e) Complete chapters 31,Gas Certification
6. Understand the various types of oil heating systems, their components and function. (CSLO 6)
   a) Identify the components found in oil heating systems
   b) Understand the function of each component
   c) Test the components of the oil heating system
   d) Use proper terminology and list all information required to obtain a replacement part for each component
   e) Complete chapters 32
7. Understand the various types of hydronic heat, their components and function. (CSLO 6)
   a) Identify the components found in hydronic heating systems
   b) Understand the function of each component
   c) Test the components of the hydronic heating system
   d) Use proper terminology and list all information required to obtain a replacement part for each component
   e) Complete chapter 33

Required Assessment:

Assessment Names and Descriptions:

1. **Safety:** Chapter 4 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. **Evaporators:** Chapter 21 Define and identify the different types of evaporators used in heating, air conditioning, and refrigeration systems. (CSLO 2)
3. **Condensers:** Chapter 22 Define and identify the different types of condensers used in heating, air conditioning, and refrigeration systems. (CSLO 3)
4. **Ice Makers:** Chapter 27 Understand the operation and identify the components used in icemaker systems. (CSLO 2, 3, 4, 5)
5. **Refrigeration Components:** Chapter 29 Understand the operation and identify the components used in refrigeration systems. (CSLO 2, 3, 4, 5)
6. **Air Conditioning:** HVAC Excellence Complete the air conditioning certification exam. (CSLO 7)
7. **Heating Equipment and Fuels:** Chapter 30 Understand the operation and applications of the various types of heating equipment and fuels. (CSLO 6)

8. **Gas Heat:** HVAC Excellence Complete the ESCO Institute gas certification exam. (CSLO 7)

CSLO/Assessment Alignment and grade distribution:

Assessment	CSLO	PSLO
Safety	CSLO 1	PSLO 5
Evaporators	CSLO 2	PSLO 2
Condensers	CSLO 3	PSLO 3
Ice Makers	CSLO 2, 3, 4, 5	PSLO 4
Refrigeration Components	CSLO 2, 3, 4, 5	PSLO 1
Heating Equipment and Fuels	CSLO 6	PSLO 6
Gas Heat	CSLO 7	PSLO 7

Grade Distribution

ELearn Exams 40%
Review Questions 40%
HVAC Excellence Air Conditioning Certification 5%
HVAC Excellence Gas Certification 5%
Daily Participation 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