

COURSE SYLLABUS

MN 224 – Principles of Thermodynamics

Instructor:
Phone:
E-mail:

Credit Hours: 3
Semester:
Room:

Catalog Course Description

Fundamentals of refrigeration and air conditioning; control systems, compressors, and absorption systems; cooling and dehumidification; air distribution, measurement, and cleaning; refrigerant recovery, recycling, and reclaiming. (class 2 hours, lab 3 hours)

Prerequisites:

None

Corequisites:

None

Textbook/Materials (indicate whether required or recommended)

Althouse, A.D., and others. Modern Refrigeration and Air Conditioning, 18th edition, 2004. (required)

Institutional Student Learning Outcomes

- ISLO2. Competence in a Specialty Area
- ISLO5. Information and Technology

Program Student Learning Outcomes

- PSLO2. An ability to conduct experiments, collect, analyze, and interpret data. [ISLO5]
- PSLO11. The ability to use the techniques, skills, and modern engineering tools necessary to function as a industrial maintenance technician. [ISLO2]

I. Course Student Learning Outcomes

Students will demonstrate the ability to:

- CSLO1: Employ the principles, procedures, and applications of refrigeration and thermodynamics. [PSLO2] [PSLO11]
- CSLO2: Employ the principles, procedures, and applications of Electrical Fundamentals, Circuit, Motors and Control Systems. [PSLO2] [PSLO11]
- CSLO3: Employ the principles, procedures, and applications of Air Distribution, and specific HVAC systems. [PSLO2] [PSLO11]

Alignment of Assessments with CSLOs (actual assessments are defined below)			
CSLOs	CSLO1	CSLO2	CSLO3
	a) Lab Exercises	a) Lab Exercises	a) Lab Exercises

Assessments:	b) Pop Quizzes c) Hourly Exam d) Final Exam	b) Pop Quizzes c) Hourly Exam d) Final Exam	b) Pop Quizzes c) Hourly Exam d) Final Exam
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II. Course Objectives

- O1. Demonstrate knowledge of the history and fundamentals refrigeration and terminology; temperature, pressure, and measurements. [CSLO1, CSLO2]
- O2. Describe and demonstrate knowledge of tubing and fittings; refrigeration tools; instruments and gauges. [CSLO1, CSLO3]
- O3. Describe and demonstrate basic knowledge of refrigeration systems, compression systems and compressors. [CSLO1, CSLO3]
- O4. Describe and demonstrate knowledge of compression systems and compressors. [CSLO1, CSLO3]
- O5. Describe and demonstrate knowledge of refrigeration controls. [CSLO2, CSLO3]
- O6. Describe and demonstrate knowledge of electrical fundamentals and controls, motors, and servicing motors. [CSLO2, CSLO3]
- O7. Describe and demonstrate knowledge of refrigerants, refrigerant recovery, recycling, and reclaiming. [CSLO3]
- O8. Describe and demonstrate knowledge of air distribution, air measurement and cleaning. [CSLO3].
- O9. Describe use of small hermetic systems, heat pumps and central air systems and energy management systems. [CSLO3]

III. Assessment

Grades will be determined in the following manner:

			<u>Assessment Method</u>
A1.	Laboratory Participation	= 40%/	Test/Performance
A2.	Pop Quizzes	= 15%	Test
A3.	Hourly Exam	= 30%	Test
A4.	Final Exam (written comprehensive)	= <u>25%</u>	Test
			100%

- A1. Lab exercises will be performed throughout the semester to apply the concepts discussed in the class lecture. The instructor will observe the students and sign off on each student's lab work. **Regular classroom/laboratory attendance and participation is mandatory.** Missed lab work must be made up in a timely manner (see note below) in order to receive credit for that portion of the course. **Multiple unexcused absences may result in automatic failure of the class.** [CSLO1- CSLO3]
- A2. Pop Quizzes (either written or performance-based) will be given intermittently throughout the semester to encourage students to attend class prepared for the week's lesson and to review their understanding of the material. [CSLO1 – CSLO3]

- A3. Hourly exam will be given during the course of the semester. This cognitive-based exam will require students to demonstrate knowledge of HVAC systems and applications. [CSLO1 – CSLO3]
- A4. A final written exam will be given at the end of the semester to assess the student’s cognitive understanding of HVAC Systems and applications. [CSLO1 – CSLO3]

Note: Make-up tests (A3, A4) will be given only in the case of an excused absence, at the discretion of the instructor.

IV. Topics:

Topics discussed in this course shall include, but not be limited to, the following:

Week:

- 1. Fundamentals of Refrigeration
- 2. Refrigeration Tools and Materials
- 3. Basic Refrigeration Systems
- 4. Compressor Systems and Compressor
- 5. Refrigerant Control Tools – Hour Test 1
- 6. Electrical-Magnetic Fundamentals
- 7. Electric Motors
- 8. Electric Circuits and Controls
- 9. Refrigerants – Hour Test 2
- 10. Refrigerant Recovery/Recycling/Reclaiming
- 11. Servicing and installing small hermetic systems
- 12. Air Distribution, Measurement, and Cleaning
- 13. Air Conditioning and Heating Control Systems – Hour Test 3
- 14. Central Air Conditioning and Heat Pumps
- 15. Servicing and Troubleshooting Simplified
- 16. Final Exam (A4)

V. Grading Scale

Letter grades will be assigned in accordance with the Academic Regulations in the Chattanooga State catalog as follows:

90-100	A
80-89	B
70-79	C
65-69	D
Below 65	F

VI. Course Delivery Format

Standard Format – This format is the traditional format and may use an on-line format (**eLearn**) to provide access to “static” materials which include the syllabus, course material, contact information, and presentations. Faculty must make

available, when requested, a copy of the syllabus and any other instructor provided course materials, including instructor contact information. Faculty may require on-line activities and assignments to include on-line tests and submission of all written and on-line communications. The extent of on-line activities/assignments may vary by course but will be specified on the syllabus.

VII. College Policies

This class is governed by the policies and procedures stated in the current Chattanooga State Student Handbook. Additional or more specific guidelines may apply.

ADA Statement

Students who have educational, psychological, and/or physical disabilities may be eligible for accommodations that provide equal access to educational programs and activities at Chattanooga State. These students should notify the instructor immediately, and should contact Disabilities Support Services within the first two weeks of the semester in order to discuss individual needs. The student must provide documentation of the disability so that reasonable accommodations can be requested in a timely manner. All students are expected to fulfill essential course requirements in order to receive a passing grade in a class, with or without reasonable accommodations.

Disruptive Students

The term “classroom disruption” means – student behavior that a reasonable person would view as substantially or repeatedly interfering with the activities of a class. A student who persists in disrupting a class will be directed by the faculty member to leave the classroom for the remainder of the class period. The student will be told the reason(s) for such action and given an opportunity to discuss the matter with the faculty member as soon as practical. The faculty member will promptly consult with the division dean and the college judicial officer. If a disruption is serious, and other reasonable measures have failed, the class may be adjourned, and the campus police summoned. Unauthorized use of any electronic device constitutes a disturbance. Also, if a student is concerned about the conduct of another student, he or she should please see the teacher, department head, or division dean.

Affirmative Action

Students who feel that he or she has not received equal access to educational programming should contact the college affirmative action officer.

Academic Integrity/Academic Honesty

In their academic activities, students are expected to maintain high standards of honesty and integrity. Academic dishonesty is prohibited. Such conduct includes, but is not limited to, an attempt by one or more students to use unauthorized information in the taking of an exam, to submit as one's own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person, or to knowingly assist another student in obtaining or using unauthorized materials. Plagiarism, cheating, and other forms of academic

dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions, which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an "F" or zero for an activity or to assign an "F" for the course.

Children

It is Tennessee Board of Regents policy that children are not permitted in the classrooms or laboratories. If you have children who must stay home for some reason, you must make other arrangements for their care than bringing them with you to class.

Communication

Tigermail is the official communication for students.

The instructor reserves the right to modify this syllabus in writing during the course of the semester.

VIII. Instructor Policies

Cell Phones

Activation of these devices represents a distraction and their use during lectures and labs (including instant messaging, games, and etc.) will be considered extremely disruptive to the learning environment. Please turn off (or set to vibrate) all such devices before entering the classroom. Please excuse yourself from the room if an emergency requires you to make or receive a phone call during class. If your cell phone goes off during a testing period, five points will be deducted from your test.

Use of Computers/Printers

The use of a computer is mandatory for all students. Students will have access to the computers in C24, C33, C54, C84, & C87. These computers are connected to the ET server and can be used to access Microsoft Office and other software.

There may be times when one of the computer rooms will not be available; these times will be posted with as much advance notice as possible. **It is the student's responsibility to see that his or her username and password are working properly and that his or her password is protected.** It is also the student's responsibility to back-up needed files. The school will not be responsible for any computer files that get "lost" or damaged.

Back-up documentation for this class (such as the class syllabus, handouts, description of class assignments, etc.) will be available to the students through eLearn. Printers are to only be used by Engineering Technology students for assignments related to engineering and engineering technology classes or labs. Paper availability may be subject to print management activities and will be requested through assigned faculty. Please help conserve paper.

Classrooms & Labs

Food and drinks are prohibited in all Engineering Technology classrooms and labs

located in the Branch Center for Technology. Only plain water in a sealable container is permitted. Any form of tobacco products are also prohibited in accordance with College and TBR policy.

To Log-in C24, C33, C54, C84, & C87: Username: ET_last name first initial middle initial (*no spaces*)

Password: student

Domain (log-in): CSTCC

Note: *Be sure to change your password after your initial log-in.*