

COURSE PREFIX:	ACR 221
COURSE TITLE:	Residential Load Calculations
LEC HRS/ WEEK:	2.0
LAB HRS/WEEK:	0.0
CREDIT HRS/SEMESTER:	2.0

[DL ATTENDANCE/VA STATEMENT](#)
[TEXTBOOK INFORMATION](#)

Course Description:

This course is a study of heat losses/gains in residential structures.

Course Competencies:

Upon successful completion of this course, the student should be competent to perform the following. The first column indicates the ARI Curriculum Task number. Column 2 indicates whether the task is knowledge based (K) or a physical Task (T) to be completed in a lab or outside class hours.

Module 1: Definitions and Concepts

Classroom:

09.A.01	K	Define “U” value: (Btu/hr·ft ² ·°F).
09.A.02	K	Define “K” value: (Btu/hr·ft ² ·°F).
09.A.03	K	Define “C” value: (Btu/hr·ft ² ·°F).
09.A.04	K	Define “R” value: (hr·ft ² ·°F/Btu).
09.A.05	K	Interpret heat transfer tables (“U,” “K,” “C,” “R”).
09.A.06.a	K	Explain the heat load sources: conduction.
09.A.06.b	K	Explain the heat load sources: infiltration (sensible and latent).
09.A.06.c	K	Explain the heat load sources: product.
09.A.06.d	K	Explain the heat load sources: miscellaneous loads (people, motors, equipment, sensible, and latent).
09.A.06.e	K	Explain the heat load sources: radiation.
09.A.07	K	Explain the purpose of vapor barriers.

Module 2: Load Calculations

09.A.08	K	Interpret tables of specific heat values, latent heat, and heat of respiration.
09.C.01	K	Interpret structure design data.
09.C.02	K	Interpret building prints – size of rooms, etc.
09.A.09	T	Calculate total heating transfer value of any surface (R) - (U).
09.C.03	T	Determine total resistance to heat flow (“R”), (“U”).
09.C.04.a	T	Calculate conduction loss: walls.
09.C.04.b	T	Calculate conduction loss: roofs.
09.C.04.c	T	Calculate conduction loss: floors.
09.C.04.d	T	Calculate conduction loss: windows.
09.C.04.e	T	Calculate conduction loss: basement (walls, floor).
09.C.04.f	T	Calculate conduction loss: unconditioned space.
09.C.05.a	T	Calculate infiltration: doors.
09.C.05.b	T	Calculate infiltration: windows.

09.C.06	T	Calculate ventilation load.
09.C.07	T	Calculate duct loss.
09.C.08	T	Calculate effects of bath and kitchen exhaust.
09.C.09	T	Calculate effects of power roof ventilators.
09.C.10	T	Calculate total heating load.
09.D.01	K	Interpret structure design data.
09.D.02	T	Calculate “U” values for building material.
09.D.03	T	Calculate Cooling Load Temperature Difference (CLTD).
09.D.04	T	Make corrections for CLTD.
09.D.05.a	T	Calculate conduction loads: walls.
09.D.05.b	T	Calculate conduction loads: roofs.
09.D.05.c	T	Calculate conduction loads: windows.
09.D.05.d	T	Calculate conduction loads: doors.
09.D.05.e	T	Calculate conduction loads: unconditioned space.
09.D.05.f	T	Calculate conduction loads: floors.
09.D.06	T	Calculate lighting load.
09.D.07	T	Calculate equipment load.
09.D.08.a	T	Calculate infiltration and ventilation load: heat load.
09.D.08.b	T	Calculate infiltration and ventilation load: moisture loads.
09.D.09	T	Calculate duct gain.
09.D.10	T	Calculate refrigeration sensible heat ratio.
09.D.11	T	Calculate storage factor.
09.D.12	T	Calculate effects of bath and kitchen exhaust.
09.D.13	T	Calculate effects of power roof ventilators.
09.D.14.a	T	Calculate total cooling load: sensible loads.
09.D.14.b	T	Calculate total cooling load: latent loads.

Course Requirements

Students are responsible for attaining competencies through completion of the following course requirements:

Attendance Policy

Students will be bound by the policies stated in the York Technical College Student Handbook. Students must attend 80% of the hours assigned the class for a semester to receive credit for the course. In case a student does miss a class, the student is responsible for obtaining the material that was covered during the absence. If a student is aware that a class will be missed, then the student should notify the instructor at the earliest possible date. Students with unexcused absences during tests will be allowed to make up tests at the discretion of the instructor. The student has the burden to be sure that some arrangement has been made with the instructor for taking a make-up test.

Academic Honesty

York Technical College adheres to the South Carolina Tech Student code, approved by the State Board for Technical and Comprehensive Education on March 13, 1974 (revised last April 25, 1984). Copies of this code are available in the Library and from Student Services. Any student involved in cheating or any other academic dishonesty will be given a grade of zero and will be subject to further disciplinary action. See the student handbook section “Student Life” subheading “Student Conduct” for further details.

Class Participation

Students will be expected to participate in class discussions, to demonstrate problem-solving techniques, to complete tests, homework, lab experiments, lab reports and other assigned work.

Evaluation Strategies/Grading

The grading scale will be as follows:

Grade Points

A	90-100
B	80-89
C	70-79
D	60-69
F	00-59

Evaluation Method

Tests may be written or oral and may contain questions that are true or false, short answer, multiple choice, fill in the blank and/or problems. Students should refer to the instructor for the number of tests to be given and the material to be covered on each test. Each test will be of equal weight unless otherwise indicated by the instructor. Project grade will be based on the completion of the Course Competencies, team work, safety, and class participation.

Final grades will be determined as follows:

Module 1	Tests	25%
Module 2	Tests	25%
	Load Calculation Project	50%
Total Grade		100%

Entry-Level Skills

Students should demonstrate hand eye coordination, manual dexterity, and be able to work in an industrial environment.

Prerequisites

RDG031 or equivalent

Co-Requisites

None