

**NEOSHO COUNTY COMMUNITY COLLEGE
MASTER COURSE SYLLABUS**

COURSE IDENTIFICATION

Course Code/Number: ENRG 106

Course Title: Residential HVAC Systems Analysis

Division: Applied Science (AS) Liberal Arts (LA) Workforce Development (WD)
 Health Care (HC) Lifetime Learning (LL) Nursing Developmental

Credit Hour(s): Three (3)

Effective Date: Fall 2013

Assessment Goal Per Outcome: 70%

COURSE DESCRIPTION

Students will investigate the physical principles of heating, ventilation, and air conditioning commonly found in the residential setting. Topics will include: the energy equation, change of state, and refrigeration. The course will also cover heat equation, psychometrics, heating and cooling load equations, piping system design, duct system design, solar effects, effects of thermal mass, and central forced air furnaces. Students will learn Seasonal Energy Efficiency Ratios (SEERs), Energy Efficient Resource Standards (EERs), Annual Fuel Utilization Efficiency (AFUEs,) fuels, and unitary single zone and multi-zone secondary systems. This course requires field work where students will identify and perform calculations.

MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES

ENRG 102 Energy Physics

TEXTS

The official list of textbooks and materials for this course is found on [myNeosho](http://www.neosho.edu).

<http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx>

GENERAL EDUCATION OUTCOMES

1. Practice Responsible Citizenship through:
 - identifying rights and responsibilities of citizenship,
 - identifying how human values and perceptions affect and are affected by social diversity,
 - identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
 - listing factors associated with a healthy lifestyle and lifetime fitness,
 - identifying the importance of lifetime learning,
 - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
3. Communicate effectively through:
 - developing effective written communication skills,
 - developing effective oral communication and listening skills.
4. Think analytically through:
 - utilizing quantitative information in problem solving,
 - utilizing the principles of systematic inquiry,
 - utilizing various information resources including technology for research and data collection.

COURSE OUTCOMES/COMPETENCIES (as Required)

Upon the successful completion of the course, the student should be able to:

1. Demonstrate an understanding of the physical principles of heating, ventilation, and air conditioning.
2. Discuss effects of solar, thermal mass and system design in the heat equation.
3. Demonstrate an understanding of SEERs, EERs, and AFUEs.
4. Demonstrate an understanding of single zone and multi-zone systems and associated efficiencies.

MINIMUM COURSE CONTENT

The following topics must be included in this course. Additional topics may also be included.

- I. Introduction
- II. Air-Conditioning Systems
- III. Moist Air Properties and Conditioning Processes
- IV. Comfort and Health – Indoor Air Quality
- V. Heat Transmission
- VI. Space Heating Load
- VII. Solar Radiation
- VIII. Cooling Loads
- IX. Energy Calculations and Building Simulation
- X. Flow, Pumps, and Piping Design
- XI. Space Air Diffusion
- XII. Fans and Air Distribution

- XIII. Direct Contact Heat and Mass Transfer
- XIV. Extended Surface Heat Exchanges
- XV. Refrigeration

STUDENT REQUIREMENTS AND METHOD OF EVALUATION

INSTRUCTIONAL METHODS

1. Lecture
2. Audio-Visual aids
3. Example and demonstration
4. Review of student applications
5. Class discussions
6. Field trips and guest speakers
7. Tests (written)
8. Skills tests (performance-based)

STUDENT REQUIREMENTS

Evaluation of student performance is determined primarily from results of written tests to validate mastery of course competencies.

GRADING SCALE

90-100 %	A
80-89 %	B
70-79 %	C
60-69 %	D
0-59 %	F

ASSESSMENT OF STUDENT GAIN

Students will be assessed through written testing and assignments. Comparison will determine the extent of student gain.

Attendance Policy

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.
2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor

has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified. Please refer to the Student Handbook/Academic Policies for more information

3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

ACADEMIC INTEGRITY

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

ELECTRONIC DEVICE POLICY

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

NOTE

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

ACCOMMODATIONS

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

NON-DISCRIMINATION POLICY

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

<http://www.neosho.edu/Departments/NonDiscrimination.aspx>

SEXUAL MISCONDUCT POLICY (TITLE IX)

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms. All instructors are considered mandatory reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

<http://www.neosho.edu/TitleIX.aspx>

COURSE NOTES