

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
AIR 207 – HEAT LOADS AND PSYCHOMETRICS (4 CR.)**

Course Description

Studies air and its properties, characteristics and measurements as they apply to human comfort. Considers control of temperature, humidity and distribution of air and air mixtures. Studies heat loss and heat gain factors. Considers the effect, the selection and layout of residential air conditioning and refrigeration systems. Lecture 3 hours. Laboratory 3 hours.

General Course Purpose

This course is a one-semester course designed to provide the student with the concept of air and its properties and heat and heat transfer for the purpose of load estimation and equipment selection.

Course Prerequisites/Corequisites

Prerequisite: AIR 121. A proficiency in basic Algebra is highly recommended

Course Objectives

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

- Define and explain the basic principles relative to human and mechanical comfort
- Define and explain the basic principle of air and its properties (terms and definitions)
- Define and explain heat and the heat concept
- Identify types of air delivery systems
- Design conditions – indoor and outdoor climate
- Interpret and analyze various tables and charts relating to psychometrics
- Calculate and analyze various air problems
- Measure and plot air samples
- Analyze heat transfer calculations and perform various calculations using load estimation forms; compare the completed form to a computer assisted load estimation
- Study the effects of moisture in air
- Determine the correct air delivery methods and systems – air distribution, fans, coil, and coil selection
- Define and determine air balance methods
- Perform experiments using by-pass air and return air
- Complete load calculations and equipment selection

Major Topics To Be Included

- Introduction to heat and its concepts
 - What is heat?
 - 2. Methods of heat transfer
 - 3. Sources of heat
 - 4. Human comfort
 - 5. Calculation of heat
- Design conditions
 - Indoor/outdoor
 - 2. Tables/chart
 - 3. Comfort conditions
 - 4. Heat storage
 - 5. Solar heat gains
 - 6. Construction materials
 - 7. Heat transfer coefficients
- Factors and formulas

- Heat loss/heat gain
 2. Minimum/maximum requirements
 3. Layout/design
 4. Internal/external heat gain
- Air Delivery Methods
 - Air distribution, ducts
 2. Supply and return systems
 3. Air balance
 4. Air measurements
 5. Hydronic systems
 6. Heat exchange system
 7. Remote systems
- Properties of air and the psychrometric chart
 - Change in volume with temperature/pressure
 - 2. Chemical components of air
 - 3. Comfort conditions
 - 4. Psychrometric chart terms/definitions
 - 5. Air conditioning processes on the psychrometric chart
 - 6. Advanced psychrometric processes
 - 7. Air mixtures
 - 8. Design conditions
- Psychrometric process for the conditioned air supply
 - Heating and cooling with air
 - 2. Moisture calculations
 - 3. Latent heat calculations
 - 4. Bypassed air calculations
 - 5. Indoor/outdoor air calculations
 - 6. SHR lines
 - 7. Capacity of refrigerating plant
 - 8. Process air conditioning

Extra Topics (Optional)