

ME 419: Air Conditioning

This is a cooperative course taught jointly by WSU and the University of Idaho.

<i>Course description:</i>	Principles of heat and moisture transfer, air motion and purity in buildings; design of systems.
<i>Number of credits:</i>	3
<i>Course Coordinator:</i>	Robert F. Richards
<i>Prerequisites by course:</i>	ME 404
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. An understanding of engineering fluid mechanics2. An understanding of engineering thermodynamics3. An understanding of heat transfer applied to mechanical engineering problems
<i>Postrequisites:</i>	None
<i>Textbooks/other required materials:</i>	<ol style="list-style-type: none">1. McQuiston, Parker and Spitler. <i>Heating, Ventilating and Air Conditioning Analysis and Design</i>. Wiley, 2005, 6/e.
<i>Course objectives:</i>	<ol style="list-style-type: none">1. Understanding the fundamentals of heating, ventilation and air conditioning.2. Using application software for heating and cooling of building load analysis.3. Becoming familiar with the codes and standards from ASHRAE handbooks.4. Understanding efficiency improvement options.5. Understanding to relate HVAC to other disciplines such as heat transfer, fluids, thermodynamics, control and economics.
<i>Topics covered:</i>	<ol style="list-style-type: none">1. Air conditioning systems2. Properties of moist air3. Moist air processes4. Space air conditioning5. Indoor air quality--comfort and health6. Heat transfer from human body7. Heat transfer in building envelopes8. Infiltration heat load and weatherizing9. Computation of the heating load10. Heat gain by solar radiation11. Computation of the cooling load12. Energy requirements for HVAC systems; building energy audit13. Fans--performance, selection, and installation14. Air flow in ducts and fittings15. Design of duct systems16. Codes & standards for building energy systems17. Annual energy consumption
<i>Expected student outcomes:</i>	<ol style="list-style-type: none">1. Produce single-line diagrams for common HVAC system configurations from verbal specification or visual inspection of installed systems2. Identify and explain the operation of common HVAC system components3. Use both a psychrometric chart and computer-based tools to perform moist air process calculations4. Demonstrate understanding of the equipment and design processes needed to assure comfort and health for common HVAC systems5. Compute heating and cooling loads for buildings using conventional methods6. Perform basic energy audit and building system cost analyses

7. Demonstrate familiarity with codes and standards related to building energy systems
8. Specify component performance requirements to meet HVAC system needs
9. Specify a complete air distribution system including fan, ductwork, and installation requirements for a typical HVAC system

Class schedule:

Laboratory schedule: None.

Contribution to meeting the professional component: Engineering Topics

Relationship of course to program objectives: Meets:

1. School of MME ME educational objectives: 1
2. School of MME ME program outcomes: (a), (c), (e), (i), (j), (k)
3. ABET EC2000, Criterion 3 program outcomes: (a), (c), (e), (i), (j), (k)

Prepared by: J. Ahn

Date: March 20, 2013

POLICIES

A. Reasonable Accommodation (the nature of the particular course determines which one applies):

- **Pullman Campus.** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
- **WSU Online Course.** Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus: Pullman or WSU Online (<http://accesscenter.wsu.edu>), Spokane (<http://spokane.wsu.edu/students/current/studentaffairs/disability/>), Tri-Cities (<http://www.tricity.wsu.edu/disability>), Vancouver (<http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>).

B. Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The Standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

C. WSU Safety

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.