



Course Overview

This course teaches fundamental concepts and applications essential to HVAC system design. The target audience is students who hope to become HVAC designers, project managers, or mechanical coordinators for contractors. It is also suitable as an engineering elective for engineers from other disciplines who want an understanding of the HVAC systems and equipment.

Small classes of 10-15 students meet four times weekly. This class is writing-intensive. Along with exams and homework, students complete several 1-2 pp. writing-to-learn assignments and one longer paper.

Writing-Intensive Course Goals

1. Use writing to enhance understanding of the engineering principles being taught through mini writing assignments.
2. Develop an awareness of professional ethics & responsibility through major writing assignments.
3. Build written communication skills.

Why Writing?

1. When students express concepts in words, they understand more than they do by simply memorizing and dictating facts.
2. Smaller, informal writing assignments are a low-stakes way to engage students with course material & assess their progress.
3. The major writing assignment topic is relevant to professional practice, gets students interested in the field, and teaches communication skills.

Mini writing assignments to explain/apply course concepts (15% of grade):

- 3 = showed insight and did something extra
- 2 = did a credible job/ made an effort
- 1 = deficient

Major writing assignment to analyze ethical responsibility case in the field (15% of grade):

- Logic/reasoning: 8 points
- Discretionary: 4 points
- Spelling/grammar: 3 points



Mini-Writing Assignments

Students complete 3 mini writing assignments in which they are asked to explain HVAC principles to a friend, explain how particular systems work in their own words, and share their responses to the course material.

Major Writing Assignment

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AREN 3003
PRINCIPLES OF HVAC DESIGN FOR BUILDINGS
WRITING ASSIGNMENT

ENGINEERING ETHICS
AN ANALYSIS OF TWO CASES: SIMILAR OR DIFFERENT?

Read "The Filly Nine Story Crisis" by Joe Morgenson published in the New Yorker, May 29, 1989, pp. 45-53.

Then read the case of *Duncan v. Mansour Board For Architects, Professional Engineers, and Land Surveyors*, 744 S.W. 2d 544 (1988). Available at <http://www.legis.state.or.us/legis/nr/sb00000000.htm>.

The engineer for the Citicorp tower is considered a model of ethical behavior. The engineer for the Kansas City Hyatt was considered a model of unethical behavior. Prepare a report that begins with a brief statement of the facts of the two cases and then analyzes them. Form your own conclusion on whether the two cases are essentially the same or radically different. Support your conclusion with analysis using information from your reading.

Some ideas and questions to consider:

- Did either design have a fundamental flaw? A fundamental flaw means the design was destined to failure in the ordinary course of use. A non-fundamental flaw means failure occurs only in a certain set of circumstances. Does it make a difference whether the design flaw is fundamental vs. non-fundamental?
- Does it make a difference that the Kansas City Hyatt design did actually fail but the Citicorp tower design was required before a failure could occur?
- What is the role of delegation and shop drawing review? In both cases, the real problem occurred at the shop drawing stage. In the Citicorp Tower, the steel fabricator asked for permission to substitute braced connections for welded connections, presumably to make the project easier to build. In the Kansas City Hyatt case, the steel fabricator modified the design to make it easier to build. In both cases, the engineer (or the designer) approved the contractor's modification.
- Does it make a difference that the Kansas City Hyatt design was not practical to build so the steel fabricator would have had to modify it in any event?
- Does it make a difference that the Citicorp design was innovative? How far should we go how much risk should we accept to avoid stifling innovation?

Students should consult at least one other source, such as an article from a published magazine, as well as "The Rules of Professional Responsibility" for Massachusetts Engineers (2002 Code, C.C. available at <http://www.mass.gov/char/state/eng/engrules.htm>) and request 250-UMV-405 form, for opinions and guidance on

How to analyze this situation. It is OK to apply ideas or reasoning presented in one article to the other, as long as the reasoning fits with the facts. Be sure to document and attribute sources properly. Use the American Psychological Association (APA) style for citation. See the Architectural Engineering LibGuide for more information.

Hint: This assignment might be easier to complete by thinking through the questions listed above and letting the analysis lead to a logical conclusion rather than starting with a conclusion and searching for facts and reasoning to support it.

The purpose of this assignment is to learn to use research tools and sources and then to demonstrate analytical thinking and reasoning. There is no right or wrong answer. Logic and consistency count. So do spelling and grammar.

Submit reports in hard copy of 8 1/2 x 11 paper with top and bottom margins of 1" and right margins of 1/2". 11 point type with 1.5 line spacing. Target length is 1000 to 2000 words, which is usually enough to tell the story but short enough to read comfortably in a single sitting.

Contact Information

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