Eastern Illinois University
New Course Proposal
AET 3603, Mechanical Systems in Residential and Commercial Buildings

1. Catalog Description
   a. Course Number: AET 3603
   b. Title: Mechanical Systems in Residential and Commercial Buildings
   c. Meeting Times and Credit: 3-0-3
   d. Term(s) offered: Spring
   e. Short Title: Mech Sys Bldgs
   f. Course Description: Study of principles and standards of mechanical, heating, and air-conditioning systems in construction. The course will concentrate on calculation and selection of pipes, ducts, equipments for water, sewer, ventilation, heating, and air-conditioning of residential and light commercial buildings.
   g. Prerequisites: AET 3223 Architectural Drafting and Blueprint Reading and AET 2324 Electronic Control Systems.
   h. Initial Offering: Spring 2007

2. Student Learning Objectives and Evaluation
   a. Student Learning Objectives:
      1. The students will analyze the factors affecting the size and type of pipes for water supply, and sewer systems for different type of buildings and determine appropriate equipments recommendation.
      2. The students will analyze the factors affecting the size and types of pipes, ducts, pumps, ventilators, boilers, chillers, and cooling towers for heating ventilation and air-conditioning systems of buildings and determine appropriate equipments recommendation.
   b. Assessment:
      Student’s achievement of the objectives will be assessed and the grades earned in this course will be based on the following activities:
      Tests and or quizzes 60%
      Completion of projects 40%
      Projects 40% Tests & Quizzes 60%
      Analyzing the factors, and calculating the sizes and types of pipes for water supply and sewer systems and determine appropriate equipment recommendation.
Analyzing the factors, 25% 35% and calculating the size and types of ducts, pumps, ventilation, heating and air-conditioning systems and determine appropriate equipment recommendation.

c. This course is delivered in traditional format.
d. Not numbered 4750-4999.
e. Not a writing-active, writing-interactive, or writing-centered course.

3. Outline of the course
   a. The course will meet for 15 weeks of thirty 75-minute class periods.
      Week 1
      1. Introduction of the mechanical systems.
      2. Plumbing Fundamentals
      Week 2
      1. Piping Materials
      2. Codes and Standards
      Week 3
      1. Building Water Supply System Design
      2. Water Pumps and Water Softening
      Week 4
      1. Sanitary Drainage System Design
      2. Vent System Design
      Week 5
      1. Wastewater Treatment standards
      2. Community Wastewater Treatment and Disposal
      3. Alternative Waste Treatment Systems
      Week 6
      1. Building Storm Water Drainage
      2. Roof Drainage Design
      3. Surface, and Subsurface Drainage System
      Week 7
      1. Fundamentals in Thermal and Environmental Concepts
      2. Factors Influencing Occupant Thermal Comfort
      3. Moisture in Buildings
      Week 8
      1. Principles of Heat Transfer
      2. Heat Loss Computations
      3. Thermal Insulations
      Week 9
      1. Heating Ventilation and Air Conditioning Equipments
      2. Air Humidification and Dehumidification Equipments
      3. Distribution Systems
      Week 10
      1. Types of Hydronic Heating Systems
      2. Boiler Systems
3. Hot Water Heating Devices  
4. Piping and Fittings

Week 11  
1. Forced Air Heating System  
2. Duct Work  
3. Supply and Return Air Locations  
4. Furnace Locations

Week 12  
1. Electric Resistance Heating Systems  
2. Baseboard System Design  
3. Resistance Cable System Design  
4. Radiant Panel System Design

Week 13  
1. Cooling Load Computation For Buildings  
2. Heat Gain  
3. Resistance Cooling Load  
4. Energy Estimation

Week 14  
1. Forced Air Cooling System Design  
2. Duct Design  
3. Equipments  
4. Heat Pumps

Week 15  
1. Building Solar Energy System  
2. Active Solar Heating Systems  
3. Passive Solar Heating  
4. Photovoltaic Solar Heating

b. For technology-delivered or other non-traditional-delivered courses/sections, explain how the course content “units” are sufficiently equivalent to the traditional on-campus semester hour units of time described above: Not Applicable.

4. Rationale  
   a. Purpose and need:  
      Currently, Applied Engineering & Technology students in the construction concentration are not exposed to any mechanical systems implemented in modern buildings. Since our students often hold positions as construction project managers, it is necessary that they be exposed to and gain enough information in this area to fulfill their duties in these positions.

   b. Justification of the level of the course  
      Since this course deals with the mechanical systems of buildings, it is imperative students learn about the principle of construction and blueprint
reading. This course includes content above the level of community college coursework therefore it is designated at the junior level.

c. Similarity to existing course:
   None

d. Impact on program:
   This course will be required for Applied Engineering & Technology students in the construction concentration and elective for all other AET students. Upon approval of this course, AET 3803 Thermodynamics will be dropped from the catalog.

5. Implementation:
   a. Dr. Mori Toosi
   b. Additional Cost:
      No extra fees are required for this course.
   c. Textbook for the course

6. Community College Transfer:
   A community college course will not be judged equivalent to this course but may be accepted as a substitute, however, upper division credit will not be awarded.

7. Date approved by the School of Technology Curriculum Committee: \(3/21/06\)

8. Date approved by the Lumpkin College of Business and Applied Sciences Curriculum Committee: \(4/5/06\)

9. Date approved by CAA \(4/20/06\)