

MECHANICAL ENGINEERING PROGRAM
ABET COURSE SYLLABUS

**ME 359: Fundamentals of HVAC Systems (4) Required for HVAC&R Concentration,
Elective for all others**

Course Description: Fundamentals of heating, ventilating and air-conditioning
(2013-15 Catalog) (HVAC) systems, human comfort and indoor air quality, primary and secondary systems and components. 3 lectures, 1 laboratory.

Prerequisite Courses: ME 302

Prerequisites by Topic: Thermodynamics

Textbook: Fundamentals of HVAC Systems, R.R. Johnson, American Society of Heating, Refrigerating and Air-Conditioning (ASHRAE), 2000.
(and/or other required material)

References: Fundamentals of Engineering Thermodynamics, 6th Edition, M. J. Moran and H. N. Shapiro, John Wiley & Sons, Inc., 2008.

Course Coordinator/Instructor: Christopher C. Pascual, Professor of ME

Course Learning Outcomes: The student will learn about modern HVAC systems and their applications to various requirements. In particular the student will be able to:

1. analyze basic systems using the science of psychrometrics,
2. analyze simple conduction/convection heat transfer models through composite walls,
3. apply the concepts of environmental comfort to HVAC systems,
4. calculate the requirements for proper indoor air quality,
5. describe the different primary components of an HVAC system,
6. analyze a simple refrigeration system and cooling tower,
7. design and analyze duct systems paying attention to appropriate air velocities,
8. describe the components of central air systems
9. analyze and compare different central air systems

Relationship of Course to MECHANICAL ENGINEERING Program Outcomes:

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>
H	L	L		M		H	H	L	H			M

- Topics Covered:**
1. Overview of HVAC systems
 2. Basic Design Considerations
 3. Concepts of Environmental Design Indoor Air Quality
 4. Primary System Components
 5. Secondary System Components
 6. Central Systems
 7. All-Air Systems
 8. Air-and-Water Systems, All-Water Systems
 9. Unitary Systems

- Laboratory Projects:**
1. Practice reading schematic drawings
 2. Use HVAC systems installed in lab
 3. Tours of various HVAC systems on and off-campus
 4. Prepare a report and oral presentation on a LEED certified system

Class/Lab Schedule: Three 50-minute lectures per week, one 170-minute lab per week

- Contribution of Course to Meeting the Professional Component:**
- | | |
|---|-----------------|
| (a) College-level mathematics and basic sciences: | 0 credits |
| (b) Engineering Topics: Design? | 4 credits
No |
| (c) General Education: | 0 credits |
| (d) Other: | 0 credits |

Prepared by: Chris Pascual **Date:** 05/23/14
