Mechanical Engineering Dept. Department

Syllabus
ME 430: Air Conditioning (3-0-3)

Course Catalog Description:

Thermodynamics of moist air; construction of the psychrometric chart; psychrometric processes; psychrometric systems; industrial processes, air conditioning systems; duct design and air distribution methods; cooling towers. Experiments utilizing air conditioning equipment will be conducted for air conditioning systems will be practiced through a practical project in tutorial sessions.

Course Pre-requisites:

- ME 204: Thermodynamics II
- ME 315: Heat Transfer

Course Objectives:

1. 1. Introduce students to basic principles of thermal environment engineering, psychrometrics and air conditioning calculation.
2. 2. Provide students with a working knowledge of components forming air conditioning systems and applications of the basic principles mentioned in 1 above in analysis and design of AC systems.
3. 3. Provide students with a working knowledge of computer-aided calculations of thermal loads and their use in design of AC systems.

Course Learning Outcomes:

CLO1. demonstrate an understanding of various components of AC systems and how they work together in a typical real-life AC system.

CLO2. compute cooling and heating loads for a given building in a given location.

CLO3. utilize psychrometric chart to represent different AC processes and obtain thermodynamic calculations for them and analyze typical complete AC systems and represent them on psychrometric charts.

CLO4. design air distribution and AC duct systems using manual calculations as well as utilizing modeling and simulation software.

CLO5. carry out basic measurements, such as temperature, pressure, flow rate, etc. and analyze the measured values.

Learning Resources:

- F. C. McQuistion and J. D. Parker, Heating, Ventilating, and Air Conditioning: Analysis and Design, 6th Edition, Wiley, New York, 2004.
- 1. J. L. Threlkeld, Thermal Environmental Engineering, Prentice-Hall, Inc., NJ, 1970. 2. W. F. Stoecker and J. W. Jones, Refrigeration and Air Conditioning, McGraw-Hill, NY. 3. ASHRAE Handbook of Fundamentals, 2017 Edition, Atlanta, GA. 4. T. H. Kuehn, J. W. Ramsey and J. L. Threlkeld, Thermal Environmental Engineering, 3rd Edition, Prentice Hall, 1998.
- Psych; Elite; EES; MATLAB; Excel

Lecture Assessment Plan:

Assessment Task	Week Due	Weight
Mid Term Exam	None	25.0%
Quizzes	None	10.0%
Homework and Assignments	None	10.0%
Term Project + Poster + Oral Exam	None	20.0%
Final Exam	None	35.0%

Lecture Weekly Schedule:

Week#	Topics
1	Review and Introduction to air conditioning
2	Review and Introduction to air conditioning (Continue)
	Air conditioning systems
3	Air conditioning systems (Continue)
4	Air conditioning systems (Continue)
	Moist air properties and psychrometric processes and its applications in air conditioning systems
5	Moist air properties and psychrometric processes and its applications in air conditioning systems (Continue)
6	Moist air properties and psychrometric processes and its applications in air conditioning systems (Continue)
7	Moist air properties and psychrometric processes and its applications in air conditioning systems (Continue)
	Comfort and health-indoor air quality
8	Comfort and health-indoor air quality (Continue)
9	Comfort and health-indoor air quality (Continue)
	Heat transmission in building structures
10	Heat transmission in building structures (Continue)
	Cooling and heating load calculations
11	Cooling and heating load calculations (Continue)

Week#	Topics
12	Cooling and heating load calculations (Continue)
13	Space air diffusion
14	Space air diffusion (Continue)
15	Fans and building air distribution