

MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 419: Advanced HVAC and Energy Conservation Systems(3 credits): Elective Course

Course Description (2008-2010 Catalog):

Room air distribution. Fan and building air distribution. Mass transfer and humidity measurement. Direct contact heat and mass transfer extended surface heat exchangers. Refrigeration. Current energy conservation technologies, computer simulations of dynamic building energy demand

Prerequisite Course: ME 311

Prerequisite by Topic:

- Knowledge of thermodynamic properties
- Knowledge of first law of thermodynamics for open systems and its applications
- Basic knowledge of various heat transfer modes

Textbook: Heating, Ventilating, and Air Conditioning: Analysis and Design, McQuiston/Parker/Spitler, 6th edition, J. Wiley

Other Reference Material: N/A

Course Coordinator: Samir Moujaes, Professor

Course Objectives:

- Perform the necessary calculations to estimate the pressure drop in the ducting system and select fans.
- Perform the necessary calculations to design direct contact heat exchangers such as air washers and cooling towers.
- Perform the necessary calculations to design an indirect heat exchanger.
- Perform the necessary calculations to estimate thermal efficiencies and performance of a realistic vapor compression refrigeration cycle.
- Perform the necessary calculations to estimate solar loads on walls and fenestration as a function of time and location.

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal1:	Goal 2:	Goal 3:
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Provide mechanical engineering graduates with technical capabilities.						Prepare the mechanical engineering graduates to have effective workplace skills.				Instilling a sense of responsibility as a professional member of society.			
1.a	1.b	1.c	1.d	1.e	1.f	2.a	2.b	2.c	2.d	3.a	3.b	3.c	3.d
H		H		M	H	L			M	L		M	M

(L)ow (M)edium (H)igh

Topics Covered:

1. Air Conditioning System Survey
2. Fans and Building Air Distribution
3. Direct Contact Heat and Mass Transfer
4. Extended Surface Heat Exchangers
5. Refrigeration
6. Solar radiation

Laboratory Projects: None

Assessment of Student Progress toward Course Objectives

Five take home exams, one design project, one computer project and final exam

Class/Laboratory Schedule: T,Th 4:00-5:15 Fa09

Contribution of Course for meeting Professional Component:

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| (a) Mathematics and basic sciences: | 0 credit |
| (b) Engineering Topics (Design/Science): | 3 credit |
| (c) General Education: | 0 credit |
| (d) Others: | 0 credits |

Prepared By:

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Date:

September 24, 2009