MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 458 Building Heating and Cooling Loads. (4 Units) Elective

Course Description: (2019-20 Catalog)	Building heating and cooling load calculations, estimating energy consumption and operating costs for heating, ventilating and air-conditioning system design and selection. 3 lectures, 1 laboratory.
Prerequisite Courses:	ME 303 and ME 350.
Prerequisites by Topic:	Coverage of all topics presumes completion of basic engineering science courses in thermodynamics and heat transfer.
Textbook: (and/or other required material)	ASHRAE Handbook: Fundamentals, ASHRAE, 2017
References:	
Course Coordinator/Instructor:	Jennifer Mott Peuker, Assistant Professor of ME
Course Learning Outcomes:	The students will be able to: 1. Analyze psychrometric processes involved in HVAC systems. 2. Apply basic engineering sciences in the calculation of peak heating and cooling loads for a building. 3. Develop energy models for buildings and mechanical systems. 5. Discuss contemporary environmental issues and how they relate to building energy use.
Relationship of Course to Mechanical Engineering Student Outcomes:	SO 1: Mastered (M) SO 2: SO 3: SO 4: Mastered (M) SO 5: SO 6: SO 7:
Topics Covered:	1. Introduction to calculating building loads (1 lecture) 2. Heat transmission through envelope (4 lectures) 3. Solar radiation (2 lectures) 4. Fenestration (2 lectures) 5. Ventilation and infiltration (1 lecture) 6. Psychrometrics (4 lectures) 7. Climatic design information (2 lectures)

8. Thermal comfort (1 lecture)
9. Non-residential load calculations (4 lectures)
10. Energy estimating and modeling (4 lectures)
11. System selection (3 lectures)

Laboratory Projects:

1. Project: (6 weeks)
   a. Reading plans, area take-offs
   b. Internal loads, constructions
2. Mass and energy balances (1 week)
3. Transient heat transfer through building envelope (2 weeks)

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:	4 credits
Design:	0 credit
(c) General Education:	0 credits
(d) Other:	0 credits

Prepared by: Jennifer Mott Peuker

Date: 9/16/19