Welcome to MEEG 5853
Industrial Waste and Energy Management

University of Arkansas
MSE – Distance Education

Dr. Darin W. Nutter, P.E., FASHRAE
Mechanical Engineering Professor and Department Head
MEEG 204, Phone: 479-575-4503
e-mail: dnutter@uark.edu

Course Description: This course in a basic application of thermodynamics, heat transfer, fluid mechanics, and electric machinery to the analysis of energy consumption and waste streams in industrial manufacturing facilities. There is also application toward energy conservation in commercial buildings. Current techniques and technologies for energy conservation and waste minimization are covered, including energy-consuming systems and processes, utility rate analysis, economic analysis and auditing. This course may be of interest to engineers in industry, consulting, facilities, environmental sustainability, and others.

Text: Capehart, Turner, and Kennedy., *Guide to Energy Management Handbook*, 8th edition, The Fairmont Press, 2016.

Required Co-Prerequisite: MEEG 4413 or consent of instructor.

Office Hours: email preferred or phone/virtual video call by appointment.

Academic Honesty:
As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail. I, as your instructor, am committed to the principle of academic honesty and I expect each student in my class to maintain a high stand of academic integrity. To that end, you are required to be familiar with and abide by the University's 'Academic Integrity Policy' which may be found at http://honesty.uark.edu/policy. Students with questions about how these policies apply to a particular course or assignment should immediately contact Dr. Nutter.

Grades: (final grading scale based on 90/80/70/60…)

	GRADE PERCENTAGE
Homework, Quizzes, and In-class problems	20%
Assessment or Technology Report	10%
Two hourly exams	50%
Final exam (comprehensive)	20%

Homework, Quizzes, and In-class problems: 'Homework' assignments will consist of traditional out-of-class assignments via BlackBoard and BlackBoard quizzes. Collaboration on out-of-class homework, except on Blackboard quizzes, is encouraged, but is should be declared. Assignments will be posted on the Blackboard (http://learn.uark.edu) website. Disorganized or messy homework will be penalized. Due dates/times will be posted with each assignment. Also, in an effort to accommodate for unexpected events, the lowest single homework score will be dropped, no matter the reason.

Exams: Exams will follow MSE policies and procedures.

Course objectives – by the end of this or course, students will be able to:

1. explain the energy and economic benefit of energy management and waste minimization within the industrial sector [Reading Ch. 1:1-15]
2. apply a formal energy management system within an industrial setting [Reading Ch. 1:15-59, 2:61-86, 14:476-495, and 21:673-699]
3. analyze electric and natural gas utility rate structures and utility bills [Reading Ch. 3:87-130]
4. identify and apply the key engineering units and calculations of energy, power, and material with regard to energy use, energy efficiency, and waste minimization applications [Reading Ch. 5:173-183]
5. evaluate the economic viability of an energy efficiency or waste minimization measure [Reading Ch. 4:131-172]
6. analyze utility-related cost savings measures [Reading Ch. 5:183-193]
7. analyze electrical system energy efficiency measures [Reading Ch. 6-8:195-334 and 14:465-476]
8. analyze fuel-fired system energy efficiency measures [Reading Ch. 9-10:335-385 and 13:441-464]
9. analyze common waste minimization measures [lecture]
10. describe current applications of sustainability to the industrial sector [Reading Ch. 10:386-391, 15:501-536, and 19:631-644]
11. create and evaluate a prioritized energy and/or waste management plan for a facility within the industrial sector [lecture, if applicable]

Definition of <u>energy management</u>:
The efficient and effective use of energy to maximize profits (i.e., minimize costs) and enhance competitive advantage.