

Industrial Energy Management

EIN 4321 (2602) – Spring 2012 – v1

Time and Location:

Tuesday 5-6 (11:45pm-1:40pm) MCCA 2196; Thursday 6 (12:50pm-1:40pm) FLG 270

Instructor:

Dr. Timothy Middelkoop, C.E.M.

E-mail: t.middelkoop@ufl.edu (primary contact method)

Phone: +1 (352) 392-1464

Office Hours: Weil 379 TBA, otherwise by appointment. Students with appointments during office hours will be given precedence.



Class Website:

Class material will be managed by E-Learning located at <http://lss.at.ufl.edu/>.

Teaching Assistant:

Dmytro Korenkevych <korenkevych@gmail.com>; Mondays, 3 p.m. and Thursdays, 2 p.m.

Catalog Description:

Introduction to energy conservation. Supply-demand data, energy economics, investment analysis and energy legislation. Audits, waste heat recovery, cogeneration and computerized energy management systems.
(3 Credits)

Prerequisites:

EIN 4354 and PHY 2049.

Text:

“Guide to Energy Management,” Barney L. Capehart, Wayne C. Turner, and William J. Kennedy, Fairmont Press, 7th edition, 2011. ISBN: 978-1439883488

References:

“Energy Management Handbook,” Steve Doty and Wayne C. Turner, 7th edition, Fairmont Press, 2009. 978-1420088700

“2009 ASHRAE Handbook - Fundamentals (I-P),” American Society of Heating, 2009. 978-1933742540

Computer Software:

Access to spreadsheet and word-processing software is required. The ability to [read](#) and [produce](#) PDF files is required.

Course Objectives:

To enable the student to understand the basics of energy supplies and uses, and how energy can be used more efficiently in buildings and industries. To enable the student to review basic energy related sciences. To enable the student to understand the methods of energy management in homes, institutions, businesses, large buildings and industry. To enable the student to understand the realistic potential of renewable energy sources. To enable the student to develop an overall energy awareness and an efficiency ethic which can be used to help themselves and the organizations they work for.

Contribution of course to meeting the professional component:

This course contributes to the program outcomes by teaching students to: Apply knowledge of mathematics, science and engineering; Design a system, component, or process to meet desired needs; Function on multi-disciplinary teams; Identify, formulate and solve engineering problems; Communicate effectively; Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Relationship of course to program outcomes:

This course contributes to the program outcomes by teaching students to: Apply knowledge of mathematics, science and engineering; Design a system, component, or process to meet desired needs; Function on multi-disciplinary teams; Identify, formulate and solve engineering problems; Understand the impact of engineering solutions in a global and societal context; Understand contemporary engineering issues; Use the techniques, skills, and modern engineering tools necessary for engineering practice.

UF Counseling Services:

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. These resources include:

1. UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services;
2. Career Resource Center, Reitz Union, 392-1601, career and job search services.

Special Accommodations:

Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation. Requests are to be made at least one week in advance of the accommodation to provide the instructor time to make the appropriate arrangements.

Class Attendance:

Attendance for all classes is essential for continuity and understanding of the materials. Excessive absences impacts your understanding of the material and significantly degrades the benefit of your participation for the rest of the class. If you have more than four (4) unexcused absences, the instructor reserves the right to reduce your final grade by one letter. If you have more than seven unexcused (7) absences, the instructor reserves the right to assign a failing grade for the course. Late arrival or early departure may be considered an absence depending on circumstance. Accommodation (excused absences) will only be made for documented official university business or documented extenuating circumstances. Use of cell phones in class is not permitted at any time without prior approval, on the second offense the student will be asked to leave the class and the student will be recorded as absent.

Emergencies:

Students with personal or family emergencies will be given accommodation only after adequate documentation has been received. Documentation and arrangements can be made after the fact.

Class Schedule and Topics:

Week		Notes	Topics	Reading
1	2012-01-10		Introduction and Syllabus. Energy, Energy Management	1.0-1.6, A
2	2012-01-17	Q1	Fundamentals: Units, Finance, Electrical, and Thermo	4
3	2012-01-24	Q2	Standards and Policy, Energy Bills	3
4	2012-01-31	Q3	Energy Audits, Savings Analysis	2
5	2012-02-07	Q4	Lighting, Compressed Air	5, 12.1,B
6	2012-02-14	Q5	Motors, Variable Frequency Drives, and Fans	12.2,C,D
7	2012-02-21	Q6	Thermodynamics, Refrigeration	ASHRAE
8	2012-02-28	Q7	HVAC	6
Spring Break				
9	2012-03-13	Q8	Building Envelope, Insulation, Air Quality	11
10	2012-03-20	Q9	Boilers, Steam, Co-generation, Process Energy	7,8,12.4,E,F
11	2012-03-27	Q10	Commissioning and Maintenance, Measurement and Verification, Modeling	10,G,H
12	2012-04-03	Q11	Controls, Energy Management Systems (EMS), Data Analysis	9,15
13	2012-04-10	Q12	Energy Storage and Energy Optimization	
14	2012-04-17		Smart Grid, Alternative Energy, Green Buildings	13,16,17
15	2012-04-24		Project Presentations	
	2012-05-04		Final 4A (Friday May 4 th 7:30am-9:30am)	

* This schedule is tentative and will be revised throughout the class.

A: http://eere.energy.gov/office_eere/pdfs/iso_50001_energy.pdf

B: http://eere.energy.gov/industry/bestpractices/pdfs/compressed_air_sourcebook.pdf

C: <http://eere.energy.gov/industry/bestpractices/pdfs/motor.pdf>

D: <http://eere.energy.gov/industry/bestpractices/pdfs/10097517.pdf>

E: http://eere.energy.gov/industry/bestpractices/pdfs/steam4_boiler_efficiency.pdf

F: http://eere.energy.gov/industry/bestpractices/pdfs/steam8_boiler.pdf

G: http://www.evo-world.org/index.php?option=com_form&form_id=38

H: http://eere.energy.gov/femp/pdfs/mv_guidelines.pdf

Final:

The exam is closed book. A formula sheet is allowed and must be on one side of an 8½×11 page (the back must be completely blank) and consist of only formulas, constants, and unit conversions hand written in a single color with the optional use of highlighting.

Grading:

Quizzes	96
Assignments	36
Project	60
Exam	64
Total	256

Extra Credit:

There will be no individual extra credit given in this class. You are encouraged to seek help before an assignment is due if you are unsure of the quality of your work or the assignment expectations.

Homework:

All homework during the semester is optional and ungraded.

Projects and Assignments:

All assignments must be electronically submitted no later than 1 hour prior to the start of class on the day that it is due to the class website unless otherwise directed. All written material is to be typeset and professionally formatted and attached as a single PDF. **Late submissions will be deducted a letter grade for each hour that it is late.**

Submissions not using the specified file formats will receive a minimum of a one letter grade reduction. Make allowance for the submission process. Any exceptions must be cleared with the instructor at least 72 hours in advance of the due date of the assignment. The clarity, structure, and professionalism demonstrated in the assignment will be a factor in the grade.

Resubmission:

The course management software allows for resubmission, only the last resubmission will be considered for grading. Resubmissions that are made after the deadline are also considered late.

Quizzes:

All quizzes are given in class and must be completed in the class they are assigned. Accommodation will only be made for, documented official university business *prior* to quiz, or documented extenuating circumstances. Where appropriate, work must be shown and the final answer must be clearly indicated. If only one answer is indicated the first one will be graded. Points will not be awarded for questions not asked and answers are to be only written in the space allowed. **Answers are to be written clearly, illegible answers will not be graded.**

Quizzes are closed book. There is to be no communicating between students, sharing of materials, listening to music, hats with a peak, or use of wireless devices during quizzes. Use of prohibited devices, materials, or collaboration will result in an F on the exam and will be considered a violation of the academic honesty policy. Questions labeled DQ (Discussion Question) must be answered with well constructed sentences and arguments. For questions labeled EQ (Equation Question) you must show your work and clearly indicate your final answer. Points are not necessarily an indication of the difficulty or amount of effort required. If only one answer is indicated the first one will be graded. Points are not awarded for questions not asked. Answer only in the space allowed. Answers must be written clearly, illegible answers will not be graded.

Regrades:

Regrades of material is obtained by submitting a written explanation via the instructors mailbox within 72 hours of when the work is returned in class or the grade is posted. Regrades will only be discussed after submitting the work in this manner. The instructor reserves the right to regrade the entire work.

Makeup Policy:

Makeup exams and quizzes are only provided for students with documented extenuating circumstances such as family crisis, illness, official university business, etc. Non emergency makeup quizzes must be arranged at least 72 hours in advance. All quizzes will be made up with a single quiz at the end of the semester.

Group Work:

Group assessment will be based on the performance of the group as a whole and individual scores will average to the overall group score. Groups will be required to submit a *statement of participation* at the conclusion of the project. Individual grades may be adjusted based on individual performance and peer reviews.

Letter Grading:

The following percentages, rounded down, are used for the assignment of the final letter grades: 100-92 A, 91-90 A-, 89-88 B+, 87-82 B, 81-80 B-, 79-70 C, 69-60 D and 59-0 F or a curved grade, whichever is higher. Letter grades are converted to numerical scores using the following twenty point scale: A+ 20, A 19, AB 18, B 17, BC 16, C 15, D 13, E 6, and F 0.

Class policies:

Students are expected to be prepared for class and to participate in class discussion. Working together: you are encouraged to discuss the problems in homework and assignments, but all writing, programming and analysis are to be done by yourself. A good rule of thumb is that you should never copy anything other than class notes from another student. *Proper citation is required.*

Honor Code and the Academic Honesty Policy:

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

UF's Academic Honesty Policy is stated in rule [6C1-4.017](#). **It is the student's responsibility to know and understand the universities Honor Code and Academic Honesty Policy.**

Preamble: In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code.

The Honor Code: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."*

Academic Honesty Policy: An academic honesty offense is defined as the act of lying, cheating, or stealing academic information so that one gains academic advantage. As a University of Florida student, one is expected to neither commit nor assist another in committing an academic honesty violation. Additionally, it is the student's duty to report observed academic honesty violations. Violations of the Honor Code and academic dishonesty will not be tolerated. Specifically, instructors will rigorously pursue incidents of plagiarism of any type or incidents of referring to any *unauthorized* material for any class requirement.

Class Policy: All cases of academic dishonesty will be handled in accordance with university policies and regulations. The minimum penalty for a reported academic honesty violation in this class is a zero on the assignment and a letter grade reduction for the final grade. Additionally, the student will be required to successfully complete an ethics seminar determined by the instructor.

Compliance: Before submitting any work for this class, please read the policies about academic honesty. For more information contact the [Student Conduct and Conflict Resolution](#), P202 Peabody Hall, 392-1261. **All students are required to indicate that they have read and understood the class syllabus before any material will be graded.**

Software Use:

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Disclaimer:

The syllabus and course material is subject to change. All changes will be announced in class and posted on the class website. Students are responsible for all announced changes.