

1. Department, number and title of course:

Mechanical and Aerospace Engineering, EML 5465, Energy Management for Mech Engineers

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Office hours: Wednesday, 7th period 1:55-2:45, Friday, 6th period 12:50-1:40
or by appointment

Meets in room NEB 201 8th period, 3:00-3:50 PM, M,W,F

TA: TBA

2. Course (catalog) description: Credits: 3, EML 5465

3. Textbook(s), software and/or other required material:

a. Text: none, notes and handouts provided by instructor

b. Carrier HAP and other HVAC software will be provided to students at no cost.

4. Course objective:

This course has been developed to provide senior and graduate level engineering students with a more advanced presentation on energy management. The course emphasizes both field and analytical techniques for accessing energy use in buildings and industrial applications. The course suggests many methods of conserving energy, including low/no cost operational and maintenance procedures as well as more capital-intensive energy conservation measures. Methods of applying these measures as well as estimating the cost and energy savings associated with each measure are covered. Life cycle costing principles are presented as a method for determining the cost effectiveness of selected energy conservation measures. At conclusion, the student will have the tools to make decisions concerning energy use and savings in large buildings on a campus or industrial environment.

5. Course Topics

Week of	Topic	Reading Assign.	Comments
Jan 3	The Global Energy Perspective, Energy footprint	Powerpoint HAP software downloads	Discuss global energy production vs. energy use trends. Discuss impact of building energy use and its importance in the US.
Jan 10	Energy Assessment	Powerpoint Tools : duct sizing Download McQuay	Discuss use of billing data to develop site, source and cost energy indices. Discuss pros and cons of using EUI data. Discuss EUI for specific applications.

		software	Develop simple EUI data. Project discussion
Jan 17 Jan 17 is a holiday	Energy Audits	Powerpoint Tools: pipe sizing	Discuss PEA, EA and TA audit types and their relationships. HAP tutorials
Jan 24	Energy Audits cont'd.	Powerpoint	Discuss instrumentation. Discuss use of commissioning and T&B services. Perform a simple PEA and EA.
Jan 31	Cost Estimating, SPB and LCC Analyses <i>Exam #1 this week</i>	Powerpoint	Discuss cost estimating techniques. Discuss SPB and LCC calculation techniques
Feb 7	Operational and Maintenance Conservation Measures	Powerpoint	Discuss types of O&M measures, cost estimating and SPB analyses.
Feb 14	Energy Conservation Measures	Powerpoint	Discuss general concept of ECMs. Discuss categories of ECMS. Discuss and illustrate Building Envelope ECMS
Feb 21	Lighting ECMs	Powerpoint	Discuss fundamentals of lighting. Discuss lighting calculations. Discuss lighting ECMS, costing, etc.
Feb 28	Motor ECMs HVAC ECMs	Powerpoint,	Discuss fundamentals of motors. Discuss motor energy use calculations. Discuss motor ECMs. <i>Spring break is week of 7 March</i>
Mar 14	Heat recovery ECMs, CHP, alternative energy use <i>Exam #2 this week</i>	Powerpoint Tools: HAP, Psych. Analyzer	Discuss various HVAC ECMs. Discuss heat recovery ECMs. Discuss solar systems and ground source heat pump systems.
Mar 21	Energy Use Calculations	Powerpoint, software instructions	Discuss, develop and use various manual and computerized energy use analysis methods, HAP
Mar 28	Energy Use Calculations, cont'd.	Powerpoint	Discuss, develop and use various manual and computerized energy use analysis methods, HAP
Apr 4	Refrigeration analysis, combustion analysis, environmental impacts	Powerpoint	Illustrate thermodynamic principles as they relate to energy conservation.

Apr 11	Green Buildings, sustainability, LEEDS, LCA analysis		
Apr 18	Review for Exam and Exam No. 3 this week	Classes end 20 Apr	

6. There will be three exams and homework for grade. Exams will be during the normal class period. Included in homework grade is a final project. All exams are cumulative but will emphasize the most recent material. The exams will be scheduled during class hours. **PLEASE NOTE:** The test dates may change depending on the pace of covering the material. Students are responsible to be available to take tests during the announce day and time. No exceptions but for sickness or emergency.

7. Attendance Policy, Class Expectations, and Make-Up Policy

Class attendance is expected but will not be monitored. *However, this is an EDGE course and lecture videos will be posted asynchronously to Canvas* Since there is no text, your best resource are the notes you take in class. You are responsible for participating, staying up-to-date on all announcements, lectures, and homework. Excused absences for homework submission and quizzes must be consistent with university policies in the undergraduate catalog and requires appropriate documentation. Homework extensions and make-up quizzes will be provided for excused absences in which notification is provided before the assignment due date. Note: club sport activities are not excused absences, personal vacations are not excused absences, job interviews are not excused absences.

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

8. Grading Policy

All exams will be open book (text book and notebook)

Homework

55% Homework is important!!

Exam No. 1, 2, 3

15% each

Grading Scale: 95-100 A, 90-94 A-, 85-89 B+, 80-84 B, 75-79 B-, 70-74 C+, 65-69C, 61-64 C-, 56-60 D+, 51-55 D, 46-50 D-

Collaboration during homework is allowed but individual assignments will need to be completed individually. However, some assignments will allow students to work in teams of two to replicate the work environment in industry. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

9. Make-up Policy: No late assignments will be accepted. Makeup exams are not normally allowed. If you cannot attend an exam or cannot meet a due date, you must

contact the instructor prior to the exam or due date. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor prior to the exam or assignment prior to the due date will result in a zero on that exam/assignment.)

10. Class Demeanor-- Class is started on time. On many occasions, notes have already been placed on the board to expedite starting on time. Students are expected to be on time or early. Engineers are expected to be on time for meetings and you are expected to be on time for classes. Turn off cell phones, etc. before coming into class.

11. Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

12. Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

13. In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

14. University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

15. Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

16. Software Use

All faculty, staff, and students 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.

17. Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

18. Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

COVID-19

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.

- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.