

1. Department, number and title of course:

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

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**Office hours: TBD, will post on Canvas**

**Meets in room NEB 201 8<sup>th</sup> period, 3:00-3:50 PM, M,W,F**

**TA: TBA**

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

3. Textbook(s) and/or other required material: none, notes and handouts by instructor

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 6	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 13	Energy Assessment	Powerpoint Tools : duct sizing Download McQuay software	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. Develop simple EUI data. Project discussion
Jan 20	Energy Audits	Powerpoint	Discuss PEA, EA and TA audit

<b>Jan 20 is a holiday</b>		<b>Tools: pipe sizing</b>	<b>types and their relationships. HAP tutorials</b>
<b>Jan 27</b>	<b>Energy Audits cont'd.</b>	<b>Powerpoint</b>	<b>Discuss instrumentation. Discuss use of commissioning and T&amp;B services. Perform a simple PEA and EA.</b>
<b>Feb 3</b>	<b>Cost Estimating, SPB and LCC Analyses Exam #1 this week</b>	<b>Powerpoint</b>	<b>Discuss cost estimating techniques. Discuss SPB and LCC calculation techniques</b>
<b>Feb 10</b>	<b>Operational and Maintenance Conservation Measures</b>	<b>Powerpoint</b>	<b>Discuss types of O&amp;M measures, cost estimating and SPB analyses.</b>
<b>Feb 17</b>	<b>Energy Conservation Measures</b>	<b>Powerpoint</b>	<b>Discuss general concept of ECMs. Discuss categories of ECMS. Discuss and illustrate Building Envelope ECMS</b>
<b>Feb 24</b>	<b>Lighting ECMs</b>	<b>Powerpoint</b>	<b>Discuss fundamentals of lighting. Discuss lighting calculations. Discuss lighting ECMS, costing, etc. Spring break is week of 2 Mar</b>
<b>Mar 9</b>	<b>Motor ECMs HVAC ECMs</b>	<b>Powerpoint,</b>	<b>Discuss fundamentals of motors. Discuss motor energy use calculations. Discuss motor ECMs.</b>
<b>Mar 16</b>	<b>Heat recovery ECMs, CHP, alternative energy use Exam #2 this week</b>	<b>Powerpoint Tools: HAP, Psych. Analyzer</b>	<b>Discuss various HVAC ECMs. Discuss heat recovery ECMs. Discuss solar systems and ground source heat pump systems.</b>
<b>Mar 23</b>	<b>Energy Use Calculations</b>	<b>Powerpoint, software instructions</b>	<b>Discuss, develop and use various manual and computerized energy use analysis methods, HAP</b>
<b>Mar 30</b>	<b>Energy Use Calculations, cont'd.</b>	<b>Powerpoint</b>	<b>Discuss, develop and use various manual and computerized energy use analysis methods, HAP</b>
<b>Apr 6</b>	<b>Refrigeration analysis, combustion analysis, environmental impacts</b>	<b>Powerpoint</b>	<b>Illustrate thermodynamic principles as they relate to energy conservation.</b>
<b>Apr 13</b>	<b>Green Buildings, sustainability, LEEDS, LCA analysis</b>		
<b>Apr 20</b>	<b>Review for Exam and Exam No. 3</b>	<b>Classes end 22 Apr</b>	

6. There will be three exams and homework for grade. 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. 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+, 65-69 C, 61-64 C-, 56-60 D+, 51-55 D, 46-50 D-

8. **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.)
9. **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.
10. **Accommodation for Students with Disabilities** – 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.
11. **UF Counseling Services** – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
  - Career Resource Center, Reitz Union, 392-1601, career and job search services.
12. **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.

**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.

**Course Evaluation** : Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>