EML 3450 Energy Systems

Fall 2020

General Syllabus

Instructor:	Andrés Tremante	email: andres.tremante@fiu.edu
Class schedule:	Tuesday and Thursday	02:00 pm - 03:15 pm
Office hours:	Tuesday and Thursday	03:30 pm - 04:30 pm

Textbooks:

(1) Thermodynamics, *An Engineering Approach*
by Yunus Cengel, Michael Boles and Mehmet Kanoglu, 9th Edition, McGraw Hill.

(2) Renewable Energy Systems
by Henrik Lund, 4th Edition, Elsevier

(3) Alternative Energy Systems and Applications
by B.K. Hodge, 2nd Edition, Wiley

Course Web: http://web.eng.fiu.edu/tremante/EML3450/

Summary:
The fundamental aspects of advanced thermodynamic laws & cycles and conservation of mass & energy in engineering systems are addressed. Emphasis is placed on the fundamental equations and physical concepts as well as engineering applications solution techniques.

Energy Systems & Exergy Analysis
Gas Power Cycles. Improving performance by reheat and regeneration. Modeling combined Gas Turbine & Vapor Power Cycles. Other cycle aspects. Exergy of a System. Renewable Energy Systems.

General Topics

- Gas power Cycles (Chapter 9)
- Vapor and combined Power Cycles (Chapter 10)
- Exergy Analysis (Chapter 8)
- Alternative & Renewable Energy Systems (Chapter 18)

Exams:

Midterm Test 1	= 30
Midterm Test 2	= 30
Final Test	= 40
TOTAL:	100 points

Exams Schedule:

Midterm Test 1	TBA
Midterm Test 2	TBA
Final test	TBA

Grading Policy

F	0	59
D	60	69
C	70	72
C+	73	76
B-	77	79
B	80	84
B+	85	89
A-	90	94
A	95	100

Important Remark: This course is intended to be well knowledged by the student in basic thermo fluid properties and systems, such as: Control Volume Analysis using Conservation of Energy and Mass Laws as well as The First and Second Laws of Thermodynamics.

Problem Solving Methodology

One main objective of this class is to develop your **engineering problem solving skills** working alone and groups (**team work**), which will be mastered through tests and quizzes, homeworks, and/or experimental & theoretical projects. As an example, there is a preferred approach to problem solving. It is characterized by a general systematic procedure consisting of the following steps:

1) KNOWN: After carefully reading the problem, state briefly and concisely what is known about the problem. Do **not** repeat the problem statement.

2) FIND: State briefly and concisely what is to be found.

3) SCHEMATIC: Draw a schematic of the physical system. If application of the conservation laws is anticipated, represent the required control surface by dashed lines on the schematic.

4) ASSUMPTIONS: List all pertinent simplifying assumptions.

5) PROPERTIES: Use a table format to compile property values needed for subsequent calculations. Identify the source from which they were obtained.

6) ANALYSIS: Begin your analysis by applying appropriate conservation laws. Develop the analysis as completely as possible **before** substituting numerical values. Perform the calculation needed to obtain the desired results. Clearly identify your final results by **framing** them. Do not forget to indicate **units** used in your calculations.

7) COMMENTS: Discuss your results. The discussion should include a summary of key conclusions, an inference of trends, and a critique of the original assumptions.