ME 607 - Advanced Thermodynamics - Syllabus

Dr. Florio

Text : #1. Bejan, Advanced Engineering Thermodynamics, J Wiley

ISBN 0-471-67763-9

#2. Undergraduate Thermodynamics Text and Property Tables.

Prerequisites: Undergraduate thermodynamics & Equiv- Math 211- Cal 3.

Technicians are told how, engineers know how and why.

Florio 2015

WEEK	TOPIC	Pages	PROBLEMS
1	Review First Law	**1-41**	**1.6, 1.7,1.8**
2	Review Second Law	**50-76**	
3	Review continued, Availability	**104-133**	**2.3,2.8,2.10**
4	Availability Analysis	**204-220**	**3.2, 3.7**
5	Availability-Cycles		**To be assigned**
6	Property Relations	**169-180**	**4.5,4.7,4.10**
7	Equation of State	**261-276**	
	MIDTERM		**~Oct -14**
9	Property Relations Continued		**To be assigned**
10	Homogeneous Mixtures	**187-208**	**To be assigned**
11	Optimization of Systems	**620-631**	
12	Thermodynamic Design , Project choices approval		
13	Thermodynamic Design continued, Project		**~Nov**
14	**FINAL EXAM** and Project presentation*		

Exams and short quizzes: **Section ME 607-2015- All Tests and short quizzes** are closed book and notes. As necessary, a formula sheet will be provided. A **standard calculator** and **property tables** are required . Cell phones, laptops, tablets and any other communication, electronic devices are not permitted. It is the student's responsibility to notify the instructor of any possible errors in grading of the exam on the day the exam is returned. Any possible test conflicts must be reported prior to the date of the test and will not be accepted after the test is given. The conflicts must be consistent with the NJIT policy or procedure.
a. Mid-term – 35% **; Grade for any missed test will be recorded as a grade of zero .**
b. * No Make-up on HW or Special homework-30%
It is expected that the reading assignment will be complete prior to discussing material in class. On a rotating basis, HW problems may be asked to placed on the board.
Any "Homework" specifically due is due at the beginning of class and in the format specified.
c. Class participation max of 5%- If your average grade on tests and HW is at least 60 %, an active class participation score of at most 5% could be added to your score.
d. Comprehensive Final Exam and Problem presentation 30 %- No Make-up
e. The NJIT Integrity Conduct Code will be strictly enforced. Any violations will be reported to the Dean of Students.
f. Work copied or the use of unauthorized aid will not be accepted or graded.

Integrity: "A student signature is required on any exam or assignment and is understood as compliance with the academic integrity policy. No unauthorized aid was given or received. Work copied or obtained through the use of unauthorized aid will not be accepted. For homework- only- authorized aid includes discussing the problem statement, approaches for problem solving, and basic concepts related to the problem with other students in your class. Unauthorized aid includes but is not limited to solutions manuals or other solution materials or other individual's work." LAF

Homework (HW) is an important part of the course. You are expected to solve every assigned problem.
See homework format

There will be a number of labeled -special take home assignments.
For these take home assignments - take home assignments must be done solely by you without consulting any other individual or individuals.
I reserve the right to change homework assignments or format.

Quizzes: Reserve right to give a short quiz. Any missed quiz will be recorded as a grade of zero.

Mid-Term: Generally 3-4 problems which are similar to the HW, Short quizzes or class problems.

Comprehensive Final Exam and Presentation.

Attendance: You are expected to attend all classes.

Final Grade: Final grade will be based on a curve.

No sharing of equipment. Cell phones, tablets and laptops, etc must be turned off during class. Use of any communication device during a exam, test(quiz) is prohibited.
Assignment Sheet usually available at: ***moodle and web.njit.edu/~florio/FLORIO.htm***
I reserve the right to modify this syllabus as needed

FLORIO-2015

Advanced Thermodynamics----ME 607

Prerequisite: undergraduate thermodynamics, Calculus 3

Expectations:

Students are expected to be able:

a. to thermodynamically analyze and apply the laws of thermodynamics to energy systems
b. and to judge their performance
c. to analyze the optimization of the thermodynamic processes
d. to analytically determine the thermodynamic properties and the relationships between thermodynamic properties of simple compressible substances through the use of the laws of thermodynamics and mathematical relationships
f. to be able to the use and apply availability analysis to a closed and open systems
g. to determine a system's chemical availability
h. to determine stability requirements
i to use an appropriate equation of state to determine thermodynamic property relations
j. to determine thermodynamic properties of homogeneous mixtures
k. to apply the principles of thermodynamic optimization

Homework Format

Homework is an important part of this course. It is a necessary part of understanding and learning of the course material. You are expected to have solved every assigned problem. Usually numerical solutions or expressions will be given after the assignment is due. It is the student's responsibility to learn how to arrive at the final solution. LAF

Format: Solutions in pencil. Each problem starts on a separate page, 8.5 x11, with all pages stapled together.

1. Known: A brief summary of the problem, "in your own words".
2. Find: Quantities to be determined.
3. Sketch: Energy diagram Properly labeled and indicated- physical system and property diagrams
4. Assumptions: Modeling assumptions that are used in solving the problem are listed and clearly indicated as a constraint.
5. Properties: Substance identified and needed properties, value (units) and source.
6. Analysis: The problem is solved in a systematic and logical manner, showing all steps, starting from the fundamental equation(s) from which the analysis begins [and numerical values (with units) are shown]. Final results clearly indicated.
7. Discussion: Any comments relative to the results or developed modeling equations.