San José State University
Mechanical Engineering Department
ME 113 Thermodynamics, Section 1, Spring 2020

Instructor:	Nicole Okamoto
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Office Hours:	M . Feel very free to make an appointment for another time if these hours don't work for you
Class Days/Time:	Tues/Thurs 8:40-10:20
Classroom:	ENG 329
Prerequisites:	Phys 52 and Math 32, with a C- or better in each

Canvas and Course Messaging

Copies of the course materials such as the syllabus, assignments, exam review material, Powerpoint presentations, etc. may be found on the Canvas site for the class. This system will also show you your grades, and it allows you to have discussions or chat with the class. This feature may be especially helpful if you need assistance on a homework problem. Homework assignments and electronic classroom materials (such as Powerpoint slides) are posted on this site.

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Course Goals and Student Learning Objectives

Upon completion of this course, student should be able to

1) Discuss the causes of ozone depletion and global warming and the uncertainty involved in making long-term environmental predictions.
2) Discuss basic thermodynamic terms, such as enthalpy, entropy, specific and relative humidity, dew point, and adiabatic saturation and wet-bulb temperatures, in simple enough terms that someone outside the field of thermodynamics could understand what they are.
3) Understand how energy transfer processes (heat and work) affect the thermodynamic state of pure substances. This involves the ability to
    a) Use tabulated data, equations of state, and the computer program EES to determine the phase and properties (temperature, pressure, specific volume, internal energy, enthalpy and entropy) of a pure substance.
    b) Analyze the thermodynamic performance (i.e., calculate work or heat input or output, mass flow rates, and first and second law efficiencies) of common steady-flow engineering devices such as pumps, compressors, turbines, nozzles and diffusers, expansion valves, heat exchangers, and mixing chambers using the first and second laws of thermodynamics and the conservation of mass.
    c) Apply the first law of thermodynamics to simple unsteady-flow problems.
    d) Explain physical aspects of the first and second law of thermodynamics, and apply them in solving real engineering problems
4) Understand the operation of basic energy conversion devices and be able to analyze their performance, including calculation of work, heat input or output, mass flow rates, and first law efficiencies. This involves the ability to
    a) Analyze the performance of a simple Otto cycle and Diesel cycles
    b) Analyze the performance of a simple Brayton cycle with regeneration

Other technology requirements

We will be using McGraw-

LearnSmart Assignments are optional and are not worth course credit. They can help you get a good understanding of thermodynamics theory.

Essay

One short essay related to a contemporary environmental issue will also be assigned. This essay is a "Gateway Assignment" which must be passed with a C or better to pass the class. If you don't pass the first time, you will be allowed to revise and resubmit. However, the best grade you can get after resubmission is a C.

University Policies

Per University Policy S16-9 (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/" Make sure to review these university policies and resources with students.

Tentative Schedule -- may change with fair warning

Date	Lecture Topics	Problem-Solving/Quiz Topics	Text Sections	Videos
23-Jan	Basic Concepts, Pressure	Pressure	Chapter 1	
28-Jan	Forms of Energy, 1st law of Thermodynamics	Unit conversion, 1st Law of Thermo	2.1-2.7	1st Law of Thermo, Forms of Energy
30-Jan	Phase Changes, Property Diagrams, Property Tables	Property Tables	2.8, 3.1-3.5	Ozone Depletion, Greenhouse Effect
4-Feb	Equations of State	Equations of State; PT Quiz 1 Property Tables	3.6-3.8	
6-Feb	Boundary Work, Closed Systems	Closed Systems; PT Quiz 2 Ideal Gas Law	4.1-4.3	Specific Heats
11-Feb	1st law for Closed Systems	1st law for closed systems	4.4-4.5	
13-Feb	1st law for steady state, steady-flow device analysis	conservation of mass, steady flow devices	5.1-5.3	Conservation of Mass
18-Feb	steady-flow device analysis	steady flow devices; RT Quiz 1 1st law - closed sys.	5.4	
20-Feb	Steady-flow device analysis	steady flow devices		
25-Feb	Unsteady-Flow Processes	unsteady processes; RT Quiz 2 1st law -- steady flow	5.5	
27-Feb	1st law problem-solving	1st law		

14-Apr	Vapor-compression cycle	vapor-compression cycle; ST Quiz 3 Rankine cycle	11.1-11.7	
16-Apr	environmental essay review, gas mixtures	mole/mass fraction	13.1-13.2	
21-Apr	gas mixtures	gas mixtures		
23-Apr	gas mixture properties	gas mixtures; ST Quiz 4 Vapor-compression cycle	13.3	
28-Apr	humidity, psychrometric chart	humidity	14.1-14.5	
30-Apr	heating, heating with humidification	heating processes; ST Quiz 5 gas mixtures	14.6-14.7	
5-May	cooling with dehumificiation	dehumidification		
7-May	prototype testing	ST Quiz 6 air conditioning processes		
19-May	final exam and last quiz makeup opportunity 7:15-9:30 am			