

**ME 398**  
**Thermodynamics I**  
**Fall 2001**  
**Section 23387**

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**Office Hours :** Tuesday-Wednesday: 3–5 pm; Friday: 10:30–11:30 am  
And by appointment (e-mail is strongly recommended for setting appointments)

**Textbook:** *Fundamentals of Engineering Thermodynamics*, by M. J. Moran and H. N. Shapiro, 4<sup>th</sup> Ed., Wiley, 2000. Supplementary references: *Fundamentals of Classical Thermodynamics*, by G. J. van Wylan, R. E. Sonntag, and C. Borgnaake, Wiley; *Thermodynamics*, by K. Wark, Jr., McGraw-Hill.

**Objectives:** An introduction to the terminology and analysis techniques specific to thermodynamics centered around a study of the First and Second Laws; the use of tables, charts, and other sources of thermodynamic property data; improved problem-solving techniques through emphasis on a systematic approach to defining and analyzing given data; application of the basic conservation laws to engineering systems concerned with the production and utilization of energy.

**Prerequisites:** MATH 243 (Calculus II: analytic geometry and calculus, differentiation and integration) and PHYS 313Q (University Physics I: calculus based physics, mechanics and heat).

**Estimated ABET Category Content:**  
Engineering Science: 3 credits (100%)  
Engineering Design: 0 credits

**Grading Distribution:**

Homework/Quizzes:	10%
2 In-Class Examinations: (2 × 25 =)	50%
Final Examination:	40%

**Homework** problems may be assigned on each class day, and will be due at the beginning of the following class period. No late submission will be allowed. **Quizzes** may be administered without prior announcement, and will be based on *recently assigned homework*. **Examinations** will be closed book/closed notes, unless otherwise decided. A formula-sheet may be allowed. Further details will be discussed in class.

**Please Note (the fine print):**

1. No make-up test or quiz will be given except in case of a documented emergency.
2. Daily attendance is strongly encouraged; so is class participation.
3. The web-page will be used for listing assignments, changes in Exam dates, and all other emergency announcements; if you have any problem accessing it, please inform your instructor immediately.
4. It is imperative that each student has sufficient mastery of the material covered in the prerequisite courses.
5. **Policy on Academic Dishonesty:** Please refer to your student Handbook. These will be strictly enforced.

For additional information, also see your *Schedule of Courses* and the *WSU Undergraduate Catalogue*.

*Tentative Syllabus*

<b>Date</b>	<b>Topic</b>	<b>Reading Assignment</b>
20 Aug	Introduction; Units & Definitions	
22	Basic Concepts	Chap. 1
24	System, Boundary, Property	
27	Work and Energy	Chap. 2
29	Energy of a System	
31	Energy Balance: 1 <sup>st</sup> Law of Thermodynamics	
3 Sep	—	<i>(No Class: Labor Day)</i>
5	Thermodynamic Cycles	
7	State and Property	Chap. 3
10	<i>P-v-T</i> Relations; Phase Diagrams and Phase Change	
12	Thermodynamic Property Tables	
14	Generalized Compressibility Charts	
17	Ideal Gas; Internal Energy and Enthalpy	
19	Specific Heats	
21	Review	
24	<b>In-Class Examination I</b>	
26	Conservation of Mass in a Control Volume	Chap. 4
28	Conservation of Energy in a C.V.	
1 Oct	(contd.)	
3	Steady State Analysis	
5	(contd.)	
8	(contd.)	
10	Transient Analysis	
12	(contd.)	
15	—	<i>(No Class: Fall Break)</i>
17	The 2 <sup>nd</sup> Law of Thermodynamics	Chap. 5
19	(contd.)	
22	Reversible and Irreversible Processes	
24	(contd.)	
26	The Carnot Cycle	
29	(contd.)	
31	<b>In-Class Exam II</b>	
2 Nov	Entropy: The Clausius Inequality	Chap. 6
5	(contd.)	
7	Entropy Data; <i>T-dS</i> Equations	
9	(contd.)	
12	Entropy Balance for Closed Systems	
14	(contd.)	
16	Increase of Entropy Principle	
19	Entropy Balance for Control Volumes	
21-23	—	<i>Thanksgiving Recess</i>
26	(contd.)	
28	Isentropic Processes: Ideal Gas	
30	Isentropic Efficiencies	
3 Dec	(contd.)	
5	Availability Analysis	Chap. 7
7	Exergy	
10	End of the Semester Review	
12	<b>Final Exam: 8:00-9:50 AM</b>	