

**Thermodynamics I: CHEN 2374-A6
(Fall 2017)**

Learning Outcomes:

Know how to analyze systems using macroscopic thermodynamic properties, equations of state, and phase diagrams.
Be able to understand and use tabulated thermodynamic data.
Apply the fundamental laws of thermodynamics to practical problems in chemical engineering and related fields.

Textbook:

Borgnakke and Sonntag, "Fundamentals of Thermodynamics," 8th Ed. (2013).
ISBN-13: 978-1-118-13199-2.

Professor:

Dr. Tianxing Cai
Office: Room 103, Lucas Engineering
Phone: 409-880-7006, Email: tcai@lamar.edu
Office hours: Tuesday and Thursday, 3:00 – 4:30 PM, or by appointment.
Class: Monday, Wednesday and Friday: 9:10 AM - 10:05 AM, Lucas 112.

Prerequisites:

Physics I (PHYS 2425), Intro. Computer & Programming (ENGR 1301)

Important information – limiting two attempts policy:

Students are required to earn a grade of ‘C’ or better in two attempts or fewer in this course. The university policy is a maximum of four attempts. However, the College of Engineering has agreed to limit the number of attempts to complete this course to only two attempts.

Relation to other courses:

This class (and Thermodynamics II) is a prerequisite for every subsequent chemical engineering course. Mastery of this subject will be especially useful in process analysis, heat transfer, mass transfer, and reaction kinetics.

Course Policies (exceptions at the discretion of instructor)

CLASS ATTENDANCE

You should come to the class on time. A signature page may be given at the beginning of the class. If you do not sign the page because you come to the class late, your attendance will not be considered.

ASSIGNMENTS

Representative problems in each chapter will be assigned for you to practice. You should work alone when completing assignments, but may collaborate and discuss in small groups after attempting a problem without success. However, submitted work must be original. Problem sets that are copied will receive no credit. Review the academic honesty policy.

It is necessary for you to understand how to solve those problems. Also, practice good habits when doing homework: your work should be neat and easy to follow, show all steps, include references/page numbers for physical properties, and draw a box around your answer, including appropriate units and significant figures.

It is required to turn in the homework. The homework is due at the beginning of Wednesday class in the following week after the assignment; late assignments will not be accepted.

QUIZZES

Quizzes may be unannounced and can occur at any time. A quiz is usually given at the beginning or the end of the class. If you come to the class late or leave the class early, you may miss a quiz and your grade for that quiz is zero unless you have a valid excuse with the necessary document for proof. Make-up quiz will be given only by prior arrangement and only for valid, documented reasons.

A blue or black pen must be used in the quiz. Pencils or red pens are not allowed. You can only use your own calculator in the quiz. No calculator sharing with another student. You can NOT use your cell phone as your calculator in the quiz. The calculator is the only electric device which can be used in the quiz, test and exam. You are NOT allowed to remove the staple from the quiz or use your own paper.

Take-home quiz needs to be completed in the Blackboard system within the required time period. You must work on the take-home quiz by yourself. It is NOT allowed to discuss the take-home quiz with any other students.

TESTS/FINAL EXAM

There will be three tests and one final exam. A blue or black pen must be used in a test. Pencils or red pens are not allowed. No make-up tests and exams unless arranged beforehand for a legitimate reason.

If an open book test or exam is given, you can bring your textbook to the exam. Neither solution manual nor your homework can be used in the exams. The class notes CANNOT be used. If a closed book test or exam is given, you CANNOT bring your textbook and class note to the exam. Neither solution manual nor your homework can be used in the exams.

You can only use your own calculator in the test. No calculator sharing with another student. You can NOT use your cell phone as your calculator in the test. The calculator is the only electric device which can be used in the quiz, test and exam. You are NOT allowed to remove the staple from the test or use your own paper.

PROJECT

The description and requirement of the project will be given on the date of Test 3.

GRADES

A Composite grade will be calculated with the following formula and scale:

Attendance:	1%	A: 100 - 90%
Homework:	10%	B: 89 - 80%
Test 1:	20%	C: 79 - 70%
Test 2:	20%	D: 69 - 60%
Test 3:	20%	F: 59 - 0%
Final Exam:	20%	
Project:	5%	
Quizzes:	3%	
<u>Syllabus Contract:</u>	<u>1%</u>	
Total:	100%	

At the instructor's discretion, a curve might be applied, either to individual tests and/or to final grades. Curves can only help you; an 80% without a curve is guaranteed at least a "B".

Grade appeals may be submitted to the instructor no more than ten calendar days after their return.

LAST DAY(S) TO DROP COURSE

September 13th, 2017 for full refund

September 19th, 2017 for no academic penalty

November 3rd, 2017 with academic penalty

ACADEMIC HONESTY

Lamar University expects all students to engage in academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.

FORMS OF ACADEMIC DISHONESTY

The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials. Cheating includes:

- a) copying, without authorization from the instructor, another student's test paper, laboratory report, other report, or computer files, data listings, and/or programs;
- b) using, during a test, materials not authorized by the person giving the test;
- c) collaborating, without authorization, with another person during an examination or in preparing academic work;
- d) knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of test or assignment that has not been administered or assigned;
- e) substituting for another student, permitting any other person, or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit;
- f) bribing another person to obtain a test not yet administered or information about such; and
- g) purchasing, or otherwise acquiring and submitting as one's own work any research paper or other written assignment prepared by an individual or firm. (This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist).

Plagiarism shall mean the appropriation of another's work or idea and the unacknowledged incorporation of that work or idea into one's own work offered for credit. Collusion shall mean the unauthorized collaboration with another person in preparing work offered for credit. Abuse of resource materials shall mean the mutilation, destruction, concealment, theft, or alteration of materials provided to assist students in the mastery of course materials. Academic work shall mean the preparation of an essay, dissertation, thesis, report, problem, assignment, creative work or other project that the student submits as a course requirement or for a grade.

DISABILITIES

Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

For students: •

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations.

If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

EMERGENCY PROCEDURES

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.Lamar.edu) for instructions about continuing courses remotely.

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at <http://www.lamar.edu/about-lu/administration/risk-management/index.html>.

SEVERE WEATHER

Follow the directions of the instructor or emergency personnel.

Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.

If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.

Stay in the center of the room, away from exterior walls, windows, and doors.

VIOLENCE/ACTIVE SHOOTER (CADD)

CALL- 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.

AVOID- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.

DENY- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.

DEFEND- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

ACADEMIC CONTINUITY STATEMENT:

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.Lamar.edu) for instructions about continuing courses remotely. The instructor will also share this information via email and blackboard.

Tentative course schedule, outline, and suggested reading:

Week	Dates	Text	Subject	Assignment
1	Sep. 6, 8	Ch. 1	Introduction, motivation, zeroth law, definitions	HW 1
2	Sep. 11, 13, 15	Ch. 1-2	Phase portraits, using tabulated data	HW 2
3	Sep. 18, 20, 22	Ch. 2-3	First law of thermodynamics	HW 3
Test 1 covering Ch. 1-2, Sep. 25th, 9:10-10:05am (Monday)				
4	Sep. 27, 29	Ch. 3	Modes of energy transfer, heat and work	HW 4
5	Oct. 2, 4, 6	Ch. 3	Applying the first law to closed systems	HW 5
6	Oct. 9, 11,13	Ch. 4	Applying the first law to open systems	HW 6
7	Oct. 16, 18, 20	Ch. 4-5	Steady state, transient processes	HW7
Test 2 covering Ch. 1-4, Oct. 23rd, 9:10-10:05am (Monday)				
8	Oct. 25, 27	Ch. 5	Second law of thermodynamics for cycles	HW 8
9	Oct.30, Nov.1, 3	Ch. 6	Second law for closed systems	HW 9
10	Nov. 6, 8, 10	Ch. 6	Entropy and entropy generation	HW 10
11	Nov. 13, 15, 17	Ch. 7	Second law for open systems	HW 11
Test #3 covering Ch. 1-7, Nov. 20th, 9:10-10:05am (Monday)				
12	Nov. 22, 24	Ch. 7-8	Second law for open systems	HW 12
13	Nov.27,29; Dec.1	Ch. 8-9	Exergy, or energy available to do work	HW 13
14	Dec. 4, 6, 8	Ch. 9	The Rankine cycle	HW 14
Final Exam covering Ch. 1-9: Dec. 11th, 9:10-10:05am (Monday)				

ATTENTION:

- Each person will use their own calculator during the exam. No sharing of calculators will be allowed. The use of a cell phone calculator is forbidden during an exam. If you are not sure about your calculator, it is your responsibility to ensure it is permitted before the exam. The calculator is the only electric device which can be used in the quiz, test and exam.
- There is no class on Nov 24th,2017 for the Thanksgiving Holiday. Enjoy your Thanksgiving! We will still have classes on Nov 20th ,2017 and Nov 22nd,2017.
- Make up classes for the lost “Harvey” days will be on Dec 6th, 2017 and Dec 8th,2017 with final exam given on Dec 11th,2017 during regular class period.

Syllabus Contract for Thermodynamics I: CHEN 2374-A6 (Fall 2017)
(to be signed and returned to Dr. Tianxing Cai upon reviewing the syllabus)

By signing this syllabus contract, I—the undersigned [hereafter referred to as the student]—agree to uphold **all the stipulations of Lamar University's Academic Honesty Policy.**

Academic Honesty Policy

Lamar University expects all students to engage in academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.

This may include failure of the assignment, class or removal from the program.

Forms of Academic Dishonesty

The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials. Cheating includes:

- a) copying, without authorization from the instructor, another student's test paper, laboratory report, other report, or computer files, data listings, and/or programs;

- b) using, during a test, materials not authorized by the person giving the test;

- c) collaborating, without authorization, with another person during an examination or in preparing academic work;

- d) knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of test or assignment that has not been administered or assigned;

- e) substituting for another student, permitting any other person, or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit;

- f) bribing another person to obtain a test not yet administered or information about such; and

- g) purchasing, or otherwise acquiring and submitting as one's own work any research paper or other

written assignment prepared by an individual or firm. (This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist).

Plagiarism shall mean the appropriation of another's work or idea and the unacknowledged incorporation of that work or idea into one's own work offered for credit. Collusion shall mean the unauthorized collaboration with another person in preparing work offered for credit. Abuse of resource materials shall mean the mutilation, destruction, concealment, theft, or alteration of materials provided to assist students in the mastery of course materials. Academic work shall mean the preparation of an essay, dissertation, thesis, report, problem, assignment, creative work or other project that the student submits as a course requirement or for a grade.

The information, responsibilities and rights of the student, described within the syllabus for the class Thermodynamics I: CHEN 2374-A6 in Fall 2017, are also understood and agreed to.

Student Name (printed)

Student Signature

Date

LU ID#