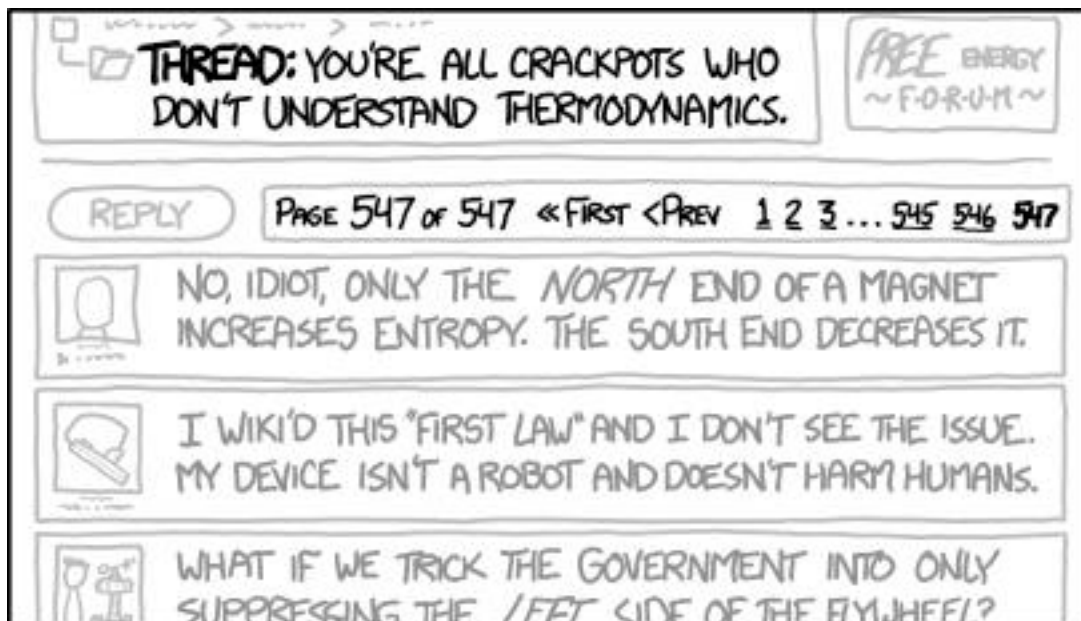




PHYS 535 01W – THERMODYNAMICS FOR EDUCATORS

ONLINE COURSE SYLLABUS: SPRING 2023



IRONICALLY, THE ARGUMENT I STARTED ON A PERPETUAL MOTION FORUM IN 2004 SHOWS NO SIGNS OF SLOWING DOWN.

<https://xkcd.com/1166/>

Instructor: Dr. Mahendra Thapa

Phone: 513-417-4087

University Email Address: Mahendra.Thapa@tamuc.edu

Course Time Zone: Central Time USA

Online Office Hours: On demand on zoom/phone

In emails, please put "PHYS 535 Online" in the subject header. I will reply to emails within 24 hours (48 at weekends and holidays). **Note:** I will exclusively use your TAMUC university email addresses for email communication.

This syllabus and any or all parts of the course contents including due dates subject to change. Students will be notified by emails/announcements in advance.

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

The required book can be ordered from online retailers for generally less than \$100.

Textbooks Required

Schroeder, V. Daniel. (1999), *An Introduction to Thermal Physics*, Addison-Wesley, ISBN-10: 0201380277, ISBN-13: 978-0201380279

Course Prerequisites

Math: Students are required to know mathematics through Calculus 3 or equivalent, or have taken or be currently taking *Mathematical Methods for Educators Course* (PHYS 530). We'll be making extensive use of algebra, basic differentiation and integration, and some partial differentiation and multiple integration. Use of the natural logarithm, exponential functions and partial differentiation will be used VERY extensively.

Physics: A course in calculus-based physics (sometimes called University physics) is required.

Course Description

Thermodynamics is the study of the flow of heat between physical systems, and the effects of those flows. It encompasses the variety of ways one can compress, expand, heat and cool fluids and solids and the ways in which one can extract or impart energy to systems. The most immediately practical application of thermodynamics involves the quantification of the amount of useful energy (work) a system can impart, a consequence that led, upon the scientific development of thermodynamics, directly to the industrial revolution and the modern world. In doing so, the far-reaching concept of entropy is introduced, the quantification of the amount of energy not available to do work - the amount of disorder in a physical system.

Kinetic theory and statistical mechanics seek to derive the laws of thermodynamics from more fundamental considerations of the underlying motions and energy states of the microscopic constituents of the system. Due to the fact that most physical systems are made up of far too large a number of constituents to describe each one individually, statistical methods have to be employed. The distribution of velocities and, more generally, energy states, among the constituents can be described mathematically described and hence the average properties of the constituents as a whole can be derived and macroscopic quantities such as pressure emerge.

The purpose of this class is 2-fold:

- 1) To give you a working knowledge of thermodynamics, kinetic theory and statistical mechanics, and their context and importance.
- 2) To discuss the teaching of these at a high school level, examine common misconceptions, explore the many tools available on the web that aid us, and to share experiences and resources as a community.

Student Learning Outcomes

At the end of the course:

1. Students will be able to correctly define energy, heat, functions of state and other thermodynamic quantities.
2. Students will be able to correctly apply the first law of thermodynamics in problems, analyze the commonly used intuitive description of the meaning of entropy, and discuss improvements to that description.
3. Students will be able to correctly apply the second law of thermodynamics in problems.
4. Students will be able to apply the statistical description of velocities of atoms and molecules to derive the pressure of a fluid and its effusion, diffusion and viscosity coefficients.
5. Students will be able to construct the simple partition functions of physical systems and use it to derive thermodynamic quantities and analyze physical systems.
6. Students will know the misconceptions encountered when teaching thermodynamics and statistical mechanics, and devise strategies to counter them that can be implemented in lesson plans.

COURSE REQUIREMENTS

Instructional Methods / Activities / Assessments

The details of the course structure are given below. Any changes will be communicated via email and announcements on MyLeo Online. Your TAMUC email account will be used at all times, and it will be your responsibility to check it regularly (at least once every 24 hours).

The course is organized into four units, each containing 3 weeks (most of which last about a week, but some of which last 2 weeks!).

Introductory tasks

The semester starts at **12.01 a.m. Tuesday, January 17th** which is when the introductory material and unit 1 will become available.

Before tackling Unit 1 and the rest of the course, you must complete the following activities which you can find in the introductory module:

- (1) Complete the **pre-course assessment**. This will be given again at the end of the course, so we can measure your learning gains on Student Learning Outcomes 1-5. This assessment will **not** count towards your class grade. *It can only be taken once* and once you begin the quiz you will have *40 minutes* to complete it. The assessment must be completed before you can gain access to the first week of the class.
- (2) Read the **syllabus**
- (3) Take the **syllabus quiz** to make sure you understand the mechanics of the course. This can be taken *any number of times*. The **syllabus quiz** will not be graded, but it must be completed *with 100% correct answers* before moving on to unit 1.
- (4) **Introduce** yourself to the class on the **"Class Introductions"** discussion thread.

NOTE: You must complete the pre-course assessment to access the rest of the class, and complete the syllabus quiz with 100% correct answers before access the first, and subsequent, units.

Regular unit tasks, material and due dates

The course material is organized into 4 units of three weeks each, most of which do indeed last a week, but be aware that some will last 2 weeks!

Always check the class schedule at the end of this syllabus.

Each unit covers a major topic in thermodynamics or statistical mechanics. Each week you will be required to complete discussion posts and quizzes, and homework will be assigned each week and collected in at the end of each unit.

Unit 1, Weeks 1-3 are available from the first day of the semester, Tuesday, Jan 17th. Subsequent units are available on the dates listed at the end of the syllabus. All 3 weeks from each unit become available when the unit opens, and homeworks from all 3 weeks are due at the end of each unit, to allow for some self pacing. ***However, note that discussion posts and***

quizzes are due weekly, and discussion posts cannot be completed ahead of the particular week they open. This is essential to ensure relatively coordinated discussion between all members of the class.

You will always be able to access previous week's material, and you can continue posting in their discussion threads, but you won't be able to take the quiz past the due date, and discussion posts after the deadline will not count towards your grade. Other than the homework, all tasks must be completed weekly. Make sure you are familiar with the schedules at the back of the syllabus.

During each week, the following tasks will be assigned, to be completed either by the end of the week (in the case of discussions and quizzes) or the unit (note: reading and viewing material are necessary to take part in the discussion and complete the quizzes accurately).

- (1) Complete the **reading assignments**. These will come from the course textbook or other articles and material posted on MyLeoOnline.
- (2) Watch the unit's **1-5 Mini-lectures** which will cover one or two key concepts at a time, to reinforce reading material, or give examples of problem solving. Sometimes I will post mini-lectures covering concepts according to student demand.
- (3) Complete the **quizzes** designed to assess students' comprehension of the reading assignments, mini-lectures and basic knowledge of key principles. Quizzes must be completed by **11.59 p.m. the scheduled day** that concludes the corresponding week.
- (4) Participate in the **discussion threads**. Each week you must make at least 3 substantial posts in each of the current unit's topics, and 2 responses to posts in the *previous* unit's topics. A week's discussion thread opens at **12.01 a.m. scheduled day** and remains open throughout the semester.
- (5) Complete the **homework**. All three weeks' homeworks will become available with the unit. Although they are intended to be completed weekly, they are collected every three weeks at the end of each unit to allow some amount of self-pacing. However, you should attempt to regularly work through homeworks; attempting to do all of them at the end of the third week will result in medically inadvisable stress and under-par results.

In addition, a Midterm and Final assessment will be set half way through the semester and at the end. These will be either a project based task, an exam, or a mixture of both.

*A complete list of due dates **for discussion posts, quizzes and homeworks are given on pp. 23-25 of this syllabus.***

Learning Activities and Assessments

The following describes the assignments you must complete which will contribute to your progress through the course and to your final grade, together with how they will be assessed.

- **Quizzes** are designed to assess students' comprehension of the reading assignments, mini-lectures and basic knowledge of key principles, often in response to the mini-lectures and reading assignments.

Quizzes are designed to provide you with assessment of your learning. Half of the quiz grade will be awarded just for completing the quiz; the other half will come from your actual quiz score.

You will only be able to take quizzes once. Once you begin taking the quiz, you will have a time limit of one hour to complete it. Once completed, you cannot return to it and revise your answers. You will see your score, however, and what answers you got wrong.

Quizzes address: Learning Outcomes 1-5

- **Ongoing Discussions** will be conducted each week on the concepts introduced in the reading material and lectures. A number of threads will be opened, one per topic. Sometimes I will ask a question or pose a problem to get you started.

Learning and understanding is significantly enhanced by active engagement in the class through continual discussion of topics. All students are required to participate in the discussions with a number of substantive posts. **Students are required to make 3 substantive posts, in three separate threads, giving your thoughts about the reading or answering the opening questions. In addition, students are required to make two posts in the *previous week's* threads, replying to posts of other students or of myself. That makes a total of 5 posts per week that will be graded.**

The rubric for grading the online discussions is found on pp.18-22 of the course syllabus.

Of course, continued discussion beyond the minimum posts required is strongly encouraged. I will pitch into the discussion at various times

during the week, answering queries and asking new questions to make sure we discuss all the week's material adequately.

When appropriate, at least one thread will be devoted to discussing how one might teach the week's concepts at the undergraduate level, and for the sharing of your own experiences and resources for the benefit of the teaching community. I hope to make the discussion threads a fun and lively forum throughout the semester!

Discussions address: Learning Outcomes 1-6

- **Weekly homework** will be set. Homework activities will fall into 3 categories:
 - Quantitative questions from the textbook
 - 250 word Reading reflections on the education literature, graded according to the rubric.
 - Tutorial homeworks, graded according to the rubric on page graded according to the rubric.

Full instructions will be provided each week, together with the method of assessment, in the weekly content area.

Homework questions will be collected in for grading at 4 different dates during the semester (roughly every 3 weeks). Homework can be delivered submitted at any time, up to the due date, under the relevant week. Homework questions will be selected for grading at random.

Homeworks address: Learning Outcomes 1-6

Homework that involves problem solving, pictures, or other material that is difficult to submit as a Word format or similar, may be submitted as hand written work scanned in or photographed. If you use a camera phone to take pictures of your work, a useful app is CamScanner (<https://www.camscanner.com>), which compiles multiple pictures into one document for ease of uploading. There is a free version that I encourage you to check out. It is your responsibility to make sure that your work is legible.

- **Midterm/Final** problems will consist of questions similar to the textbook problems and tutorial questions you have been doing. It is open book, you will have a week to complete each test, and you will be free to discuss the questions in the discussion threads those weeks. In addition, extended projects may be given.

GRADING

Full completion of quizzes (worth 1% each week)	12%
Performance on Quizzes (worth 1% each week)	12%
Discussion (worth roughly 2.5%/week)	30%
Homework (roughly 2.5% per week)	30%
Midterm/Final (8% each)	16%
Extra Credit (TBD)	Up to 5%

Current scores will be available for students to see in the Gradebook or by email. Your lowest grade in the quiz completion, quiz score, discussion and homework categories will not be counted in your final grade.

Grading Scale:

90-100%	A
80-89.99%	B
70-79.99%	C
60-69.99%	D
<59.99%	F

TECHNOLOGY REQUIREMENTS

- To fully participate in online courses, you will need to use a current, Flash enabled browser. For PC users, the suggested browser is Internet Explorer 9.0 or 10. For Mac users, the most current update of Firefox is suggested.
- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
 - 512 MB of RAM, 1 GB or more preferred
 - Broadband connection required courses are heavily video intensive
 - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
- You must have a:
 - sound card, which is usually integrated into your desktop or laptop computer
 - speakers or headphones.

- Depending on your course, you might also need a:
 - webcam
 - microphone

For courses where interactive tools are used, like VoiceThread or Class Live Pro, headphones are suggested for use with recording and playback. We recommend a webcam with an integrated microphone, such as the Microsoft LifeCam Cinema. All devices should be installed and configured before class begins.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. Java can be downloaded at:
<http://www.java.com/en/download/manual.jsp>
- Current anti-virus software must be installed and kept up to date.
- You will need some additional free software for enhanced web browsing. Ensure that you download the free versions of the following software:
 - Adobe Reader
 - Adobe Flash Player
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.
- For additional information about system requirements, please see:
<https://secure.ecollege.com/tamuc/index.learn?action=technical>
- If you use a camera phone to take pictures of your work, a useful app is CamScanner (<https://www.camscanner.com>), which compiles multiple pictures into one document for ease of uploading. There is a free version that I encourage you to check out.

ACCESS AND NAVIGATION

TECHNOLOGY REQUIREMENTS

Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

- Ensure that your browser has JavaScript and Cookies enabled.
- For desktop systems, you must have Adobe Flash Player 10.1 or greater.
- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Apple® Safari®	Latest	N/A

Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or point release of that major version) and the previous major version of iOS (the latest minor or point release of that major version). For example, as of June 7, 2017, D2L supports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
 - 512 MB of RAM, 1 GB or more preferred
 - Broadband connection required courses are heavily video intensive
 - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
- You must have a:
 - Sound card, which is usually integrated into your desktop or laptop computer
 - Speakers or headphones.
 - *For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.
- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: [JAVA web site http://www.java.com/en/download/manual.jsp](http://www.java.com/en/download/manual.jsp)
- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.

Pop-ups are allowed.

JavaScript is enabled.

Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
 - [Adobe Reader](https://get.adobe.com/reader/) <https://get.adobe.com/reader/>
 - [Adobe Flash Player](https://get.adobe.com/flashplayer/) (*version 17 or later*) <https://get.adobe.com/flashplayer/>
 - [Adobe Shockwave Player](https://get.adobe.com/shockwave/) <https://get.adobe.com/shockwave/>
 - [Apple Quick Time](http://www.apple.com/quicktime/download/) <http://www.apple.com/quicktime/download/>
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Brightspace Support

Need Help?

Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "[click here](#)" to submit an issue via email.



System Maintenance

D2L runs monthly updates during the last week of the month, usually on Wednesday. The system should remain up during this time unless otherwise specified in an announcement. You may experience minimal impacts to performance and/or look and feel of the environment.

COMMUNICATION AND SUPPORT

The following is the list of communication methods used in this class and their purposes. These include student-instructor, instructor-student and student-student communication.

You will be expected to check your university email account and log onto MyLeo Online at least once every 24 hours Monday-Friday in order to keep abreast of the latest class announcements.

- **Email** will be used by me to communicate to the class as a whole general information about upcoming assignments, due dates, and any changes in the schedule or syllabus that might occur.

I will also email students individually with occasional feedback from assignments and on the class as a whole.

Students can use email to ask me any questions about (i) course logistics (upcoming assignments, due dates...) (ii) as any questions about the way their specific assignments were graded and feedback they have been given (iii) constructive feedback to me about how the course is going and any problems/concerns with the course structure (and even things that work particularly well!)

In emails, please put "PHYS535 Online" in the subject header. I will reply to emails within 24 hours (48 at weekends and holidays)

I will always send emails to your official University Email address as

given through MyLeo. It will be your responsibility to check your university email regularly.

- **Announcements** on MyLeo Online will be used to communicate to the class as a whole general information about upcoming assignments, due dates, and any changes in the schedule or syllabus that might occur. New announcements will appear to you the next time you log in to MyLeo Online.
- **Discussion threads** for each unit should be the main way in which you ask and debate the answer to questions you have about the course material itself. Here you can brainstorm problem solving techniques and analyses of reading material. These questions should be continually addressed by your fellow students, and by myself, although in the spirit of discussion concrete answers will only be given after an honest and sustained attempt to figure out the answers yourselves.
- **We will use on demand Zoom** for students. We will set time which fits for both instructor and students.
- I will suggest/recommend other methods as necessary.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty

Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including (but not limited to) receiving a failing grade on the assignment, the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. In **ALL** instances, incidents of academic dishonesty will be reported to the Department Head. Please be aware academic dishonesty includes (but is not limited to) cheating, plagiarism, and collusion.

Cheating is defined as:

- Copying another's test or assignment.
- Communication with another during an exam or assignment (i.e. written, oral or otherwise).

- Giving or seeking aid from another when not permitted by the instructor.
- Possessing or using unauthorized materials during the test.
- Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key.

Plagiarism is defined as:

- Using someone else's work in your assignment without appropriate acknowledgement.
- Making slight variations in the language and then failing to give credit to the source.

Collusion is defined as:

- Collaborating with another, without authorization, when preparing an assignment.

If you have any questions regarding academic dishonesty, ask. Otherwise, I will assume that you have full knowledge of the academic dishonesty policy and agree to the conditions as set forth in this syllabus. **Homework and discussion posts will be randomly tested for plagiarism.**

Attendance Policy

In an online class, attendance means active participation; students are expected to spend at least 2 hours/week on the discussion threads and at least 10 hours/week is required to complete all the assignments, including reading. At least five substantive discussion posts are required by each student each unit to gain full points on the discussion part of the grade. If you are unable to log on for an extended period of time (greater than a week) then contact me *in advance* to discuss how to proceed. We recognize that many of you already have a busy work schedule, and that occasionally you might get behind in a unit. Spending even 15-30 minutes a day on class material and the discussion threads will help greatly, **and if you find yourself struggling at any time, please do not hesitate emailing me; I can be flexible to accommodate your busy schedule.** For reporting purposes, the last date of participation on "discussion" assignment will be considered as the last day of attendance in this course.

Assignment policy

Students will be responsible for knowing when due dates for homeworks, quizzes and projects are by reading the syllabus, looking at the schedules under "Course Home" and in this syllabus, and reading the relevant sections when posted on myleo-online. If the schedule changes, you will receive an email/announcement about it.

Late work

Late homeworks will be penalized by 10% by each day they are late (i.e. a Homework submitted more than 10 days late gets no credit) but nothing should be accepted after May 6, 11:59 pm. Late projects will be penalized by 10% by each day they are late. Quizzes and discussion posts will not be accepted past the due date.

Netiquette: Communication Courtesy Code

Students are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. The same rules apply online as they do in person. Be respectful of other students. Foul discourse will not be tolerated. Please take a moment and read the following links concerning "netiquette". <http://www.albion.com/netiquette/>
<http://www2.nau.edu/d-elearn/support/tutorials/discrubicrubs/netiquette.php>

UNIVERSITY SPECIFIC PROCEDURES

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#).

<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette](#)
<http://www.albion.com/netiquette/corerules.html>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

ADA Statement

Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free

from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

ONLINE DISCUSSION RUBRIC

Each week your discussion posts will be graded using the following rubric. Each week's discussion posts contribute up to 2% to your final grade.

Note: One post counts as 100 words or more on topic. Posts with less words or posts not addressing the week's class topic will not be considered for grading. Of course, the discussion should be allowed to flow naturally, and shorter posts will naturally occur, including one word posts of the type "I agree!" and "Yes!" or "No!". This is fine, and indeed necessary – it is just that the grading will be based upon posts of 100 words or more.

A reminder that netiquette should be observed at all times: please make sure you visit and understand the following resources:

<http://www.albion.com/netiquette/>

<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/netiquette.php>

Criteria	Unacceptable(0)	Poor (1)	Good (2)	Excellent (3)
Number of posts	No posts during the week.	1-2 posts during the week.	3-4 posts during the week.	5 or more posts during the week.
Spelling and Grammar	Posts are not in complete sentences, or more than half of the sentences have spelling or grammatical errors.	Between a quarter and half of sentences have spelling or grammatical errors.	Less than a quarter of sentences have spelling or grammatical errors.	No spelling or grammatical errors.
Knowledge	Posts demonstrate no evidence of knowledge of the week's reading.	Posts demonstrate evidence of only a cursory reading of the week's material, and little attempt to critically analyze it.	Posts demonstrate reasonable knowledge of the week's reading, and an attempt to critically analyze it.	Posts demonstrate evidence of comprehensive knowledge of the week's reading, and significant attempts to critically analyze it.
Appropriateness and awareness of other student contributions	Posts rude/disrespectful. No attempt to build upon other students' posts or support other people's arguments.	Minimal acknowledgment of other students' posts. Little attempt to build upon arguments.	Reasonable attempts to build upon other students' posts and contribute to their arguments.	Excellent awareness of other students' posts and substantial efforts to contribute to their arguments.
References and support	Arguments are unsupported, come across as unsubstantiated opinion.	Minimal support for students' arguments. Student's thinking unclear, hard to discern how student	Reasonable attempt to justify arguments made, with some references to the week's	Arguments are fully backed up, with clear explanations of how the student arrived at their

		arrived at their conclusions.	reading and external sources where appropriate.	conclusions, with full references to the week's reading or to external sources where appropriate.
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Credit: The following online rubrics have been used to inform the development of the rubric above:

<http://www.udel.edu/janet/MARC2006/rubric.html>

<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/discrubric.php>

https://topr.online.ucf.edu/images/f/f0/IDL6543_Discussion_Rubric.pdf

TUTORIAL HOMEWORK RUBRIC

Each graded item on the tutorial homework is worth 4 points total. The assignment of the 4 points is determined by the following rubric. An item is defined as an individual question/problem, involving a sketch, written explanation, qualitative or quantitative answer.

Points	2	1	0
Quality of written explanation OR sketch	The written explanation shows that the student has put in thought, and the reasoning is logical. OR The sketch shows that the student has put in thought, and the sketch is mostly correct.	The written explanation shows that the student has put in thought, but the reasoning makes little sense. OR The sketch shows that the student has put in thought, but the sketch is mostly incorrect.	Written explanation reflects minimal effort. OR Sketch reflects minimal effort.
Completeness	Response to question is complete. When a written explanation is required, complete sentences are used.	Response to question is incomplete. When a written explanation is required, complete sentences are not used. Much of the writing is unreadable, word	There is no response.

		choice is inaccurate, and errors severely impede communication.	
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READING REFLECTION HOMEWORK RUBRIC

Each reading assignment will be accompanied by one or more writing prompts. Students should follow the directions in the prompts. Homework will be graded according to the following rubric. Note that the maximum possible score is 16 points. Scores will be converted to percentages, so that a raw score of 16 is 100%.

Points	4	3	2	1
Clarity of main points	Main points are clear and easy to comprehend.	The main points are mostly clear, but slightly difficult to comprehend.	Main points are difficult to identify, or writing is difficult to comprehend.	Writing is incomprehensible.
Detail	Writing includes many specific details that are related to the main points.	Writing includes some specific details that are related to main points.	Writing includes very few specific details, or there are many details that are unrelated to the main points.	Writing includes no specific details.
Argument	The writer connects their main points with the details they have provided and makes a coherent argument.	The writer connects some of their main points to details provided, but the argument is may not be logically clear.	The writer's arguments or justifications are difficult to follow.	The writer includes no arguments or justifications.
Relevancy	Writing is completely	Writing is mostly related to	Writing is occasionally related to	Writing is completely

	related to the prompt.	the prompt but is occasionally off topic.	the prompt but is mostly off topic.	unrelated to the prompt.
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COURSE OUTLINE / CALENDAR

This schedule is tentative.

Unit	Week	Date week opens	Topic	Chapter/Sections
1. Basic Macroscopic Thermodynamics	1	Jan 17	Basic quantities and concepts – thermal equilibrium, heat, temperature, the ideal gas, the zeroth law of thermodynamics.	1.1-1.2
	2	Jan 23	The microphysics of the ideal gas, equipartition, work and internal energy, the first law of thermodynamics	1.3-1.4
	3	Jan 30	Thermal and transport properties of matter: heat capacity, conduction, viscosity, diffusion	1.5-1.7
2. Entropy and the statistical origin of thermodynamics	4	Feb 6	Microstates and macrostates	2.1-2.3
	5	Feb 13	Multiplicity	2.4-2.6
	6	Feb 20	Entropy and the microscopic meaning of temperature	3
3. Practical applications of thermodynamics	7	Feb 27	Macroscopic Entropy	4
	8	Mar 6	Heat Engines	5

	9	Mar 20	Chemical Thermodynamics	5
4. Statistical Mechanics	10	April 3	Phase Transitions	6
	11	Apr 17	Boltzmann statistics/The partition function	7/8
	12	Apr 24	Quantum statistics	7/8

COURSE DUE DATES: DISCUSSION POSTS

Each week, you must post at least **one** post in each of **three different** discussion threads, giving your initial thoughts on the subject of the thread or any conceptual or mathematical difficulties you are having with the thread subject. You must also post at least **two** follow up posts in your choice of the **previous week's** threads, responding to another person's comments. That makes a total of **five** posts per week that will be graded, except for the first week.

Discussion threads for a particular week open at **12.01 a.m.** To receive credit for your posts, they must be made within the time-frame outlined below. The threads remain open until the end of the semester.

WEEK	DISCUSSION THREADS OPEN	3 POSTS IN 3 DIFFERENT THREADS DUE	2 FOLLOW-UP POSTS DUE
1	Jan 17	Jan 23	Jan 25
2	Jan 23	Jan 30	Feb 1
3	Jan 30	Feb 6	Feb 8
4	Feb 6	Feb 13	Feb 15
5	Feb 13	Feb 20	Feb 22
6	Feb 20	Feb 27	Mar 1
7	Feb 27	Mar 6	Mar 8
8	Mar 6	Mar 20	Mar 22
9	Mar 20	Apr 3	Apr 5
10	Apr 3	Apr 17	Apr 19
11	Apr 17	Apr 24	Apr 26
12	Apr 24	May 2	May 4

COURSE DUE DATES: QUIZZES

The introductory week's **pre-course assessment** and **syllabus quiz** becomes available on **Tuesday 17th** at **12.01 a.m.** *For the syllabus quiz*

only, you may take the quiz as many times as you like. You will only gain access to the rest of the course once you have made 100% on the syllabus quiz and have completed the pre-course assessment.

Quizzes on each week’s reading material become available at **12.01 a.m.** on the scheduled date, with the rest of the week’s material, and close at **11.59 p.m. (midnight)** on the scheduled date.

NOTE: *Apart from the introductory quiz, quizzes can only be attempted once. Once you begin taking the quiz, you will have a time limit of one hour to complete it. Once completed, you cannot return to it and revise your answers.*

WEEK	QUIZ AVAILABLE	QUIZ DUE
1	Jan 17	Jan 23
2	Jan 23	Jan 30
3	Jan 30	Feb 6
4	Feb 6	Feb 13
5	Feb 13	Feb 20
6	Feb 20	Feb 27
7	Feb 27	Mar 6
8	Mar 6	Mar 20
9	Mar 20	Apr 3
10	Apr 3	Apr 17
11	Apr 17	Apr 24
12	Apr 24	May 2

COURSE DUE DATES: HOMEWORKS

All Homework becomes available with each unit, on the given schedule at **12.01 a.m.** There are 3 homeworks per unit, one for each week. All three are due at **11:59pm** on the due dates shown in the calendar below. Any time a homework is submitted (if before the due date), it will be considered ready for grading.

UNIT	HW AVAILABLE	HW DUE
1 (Weeks 1-3)	Jan 17	Feb 06

2 (Weeks 4-6)	Feb 6	Mar 27
MIDTERM EXAM/PROJECT	Mar 6	Apr 3
3 (Weeks 7-9)	Feb 27	Apr 3
4 (Weeks 10-12)	Apr 3	May 2
FINAL EXAM/PROJECT	Apr 17	May 4