



**Physics and
Astronomy**

EAST TEXAS A&M

PHYS 414.01W: Thermodynamics and Kinetic Theory

COURSE SYLLABUS: FALL 2026

INSTRUCTOR INFORMATION

Instructor: Dr. Kurtis A. Williams

Office Location: McFarland Science Building Room 106A

Office Hours:

- Tuesday 11am -- Noon,
- Wednesday 1pm -- 2pm
- Friday 2:30pm -- 3:30pm

University Email Address: Kurtis.Williams@etamu.edu

Preferred Form of Communication: **Email**

Communication Response Time: 1 business day

COURSE INFORMATION

THIS COURSE IS TAUGHT THROUGH THE TEXAS PHYSICS CONSORTIUM

The Texas Physics Consortium is a consortium of multiple physics programs across the state of Texas. East Texas A&M University is an affiliate member of this program. Per the agreement founding the consortium, all ETAMU students taking a course through the consortium are bound by the rules and procedures of the TPS for that course. Information about the TPC can be found through this website:

<https://www.tarleton.edu/tpc/> The Memorandum of Understanding discussing the structure of the TPC can be found at this link: [TPC MOU \(PDF\)](#)

TPC classes are run through synchronous online instruction, and all course materials are available through WTCClass, the West Texas A&M University course management system. ETAMU students are given a WTCClass account for the purposes of this program. WT Class can be accessed through the following link:

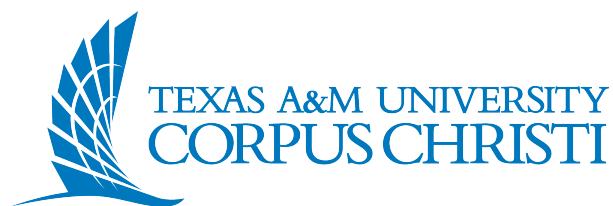
<https://login.wtamu.edu/cas/login>

The syllabus/schedule are subject to change.

The ETAMU instructor for the course is simply a local contact. They have no control over course policies, assignments, exams, or grading. Students who have a complaint concerning these policies should begin by contacting the TPC course instructor. If they are not satisfied with the results, they should then contact the TPC Chair, Dr. Daniel Marble, at marble@tarleton.edu. If students are still unsatisfied after pursuing these routes, they should contact the Department Head of the ETAMU Department of Physics and Astronomy, currently Dr. Kurtis Williams (Kurtis.Williams@etamu.edu).

The following pages are the TPC syllabus for this course and should be construed as the official course syllabus for the ETAMU section. All applicable ETAMU policies and procedures also apply.

The syllabus/schedule are subject to change.



Texas A&M University-Corpus Christi
College of Science
PHYS 3333 - THERMODYNAMICS
Department of Physical and Environmental Sciences
Fall Full Term 2026

[FALL-26] PHYS-3333-301 - THERMODYNAMICS

Course Information

Meeting Time: TR 11:00am - 12:15pm

Meeting Location: OCNR 242

Instructional Method: Two-Way Interactive Video

Course Website: <https://canvas.tamucc.edu/>

Instructor Information

Jeffery Spirko

Email: jeffery.spirko@tamucc.edu

Office Phone Number: 361-825-6020

Student Hours: MTWR 1-2:30

Office Location: NRC-1111 (Inside NRC-1100)

Appointments: A student may make an appointment to see me at times other than the scheduled office hours. I am available for consultation and extra help, but it is the student's responsibility to request such help.

Course Description

Concept of temperature, equations of state; the first and the second law of thermodynamics; entropy; change of phase; the thermodynamics functions. This course is offered through the Texas Physics Consortium (TPC). See their

website (<http://www.tarleton.edu/tpc/>) for details. Fall.

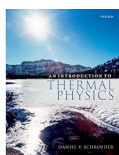
Course Overview

This course is offered through the Texas Physics Consortium (TPC). See OUR website (<http://www.tarleton.edu/tpc/>) for details. This is a typical upper-level course for physics majors, which covers thermodynamics and introduces statistical mechanics methods.

Prerequisites and Corequisites

MATH2415; PHYS2426

Required Materials



An Introduction to Thermal Physics

ISBN: 978-0192895554

Authors: D. Schroeder

Publisher: Oxford University Press

Recommended Materials

Scientific Calculator, TI-36x Pro or graphing.

Student Learning Outcomes (SLO)

By the end of this course, students should be able to:

- Apply the principles of physics to thermal physic situations.
- Solve quantitative and qualitative problems in thermodynamics and statistical mechanics.
- Each student should have an understanding of and be able to work problems at the junior/senior level

The topics involved in this course include:

- The basic problem and postulates of thermodynamics and statistical mechanics
- The conditions of equilibrium

- Simple models of thermodynamic systems (especially the Ideal Gas and Einstein Solids)
- The second law of thermodynamics, described by the statistical description of entropy, especially for the ideal gas and Einstein solid.
- Formal thermodynamic relationships
- Reversible processes and the maximum work theorem
- Alternative formulations and Legendre transformations
- Maxwell relations
- Statistical mechanics in the entropy representation: the Microcanonical formalism
- The Canonical Formalism: Statistical mechanics in Helmholtz Representation

TPC Learning Outcomes – This course contributes toward several learning outcomes that are part of the Joint BS in Physics:

- Use appropriate mathematical techniques in solving advanced physics problems. This is assessed through analytical problems in homework and on exams.
- Display critical thinking skills in applying knowledge to realistic problems and situations. This is assessed through semi-conceptual problems in homework and on exams.
- Demonstrate adequate core knowledge in physics topics: thermodynamics. This is assessed within the final exam and outside of this course in the Major Field Test

Instructional Methods & Activities

Reading Assignments: Students are expected to **read the textbook**. It's expensive and it provides a great explanation of all topics.

Lecture: Most topics will be discussed in lecture, where the instructor will give their own interpretation as a supplement to the textbook. Examples will be worked out in lecture.

This course is face-to-face. Students should plan to attend synchronously, but lectures will be recorded and provided upon request. Students outside of TAMU-CC will attend via Zoom, ideally in a classroom with their classmates.

WTCClass: All Class notes, homework assignments and videos will be posted

using TPC's WTCClass management system. It is student's responsibility to check the system prior to each class meeting, complete reading and homework assignment and submit the latter through WTCClass prior to the deadline. All graded homework will be returned via WTCClass.

Homework: Deliberate practice is more valuable than straight lecture. Homework is an obvious time for practice. Though study groups and helping each other is encouraged, each assignment must represent your own work. Copying (or even paraphrasing) others' work and claiming it as your own is plagiarism, regardless of free or open source copyright licenses.

Personal Consultations: Come visit me on Webex or Zoom (meeting ID posted on Blackboard)! Visitors to my office received candy[1]. But seriously, I strongly encourage you to talk to me on a regular basis to clarify your understanding of the course material and to seek help in completing the homework.

[1] Disclaimer: Candy not available via Zoom. There may not even be candy in my office.

Major Course Requirements

Letter grades will be determined from a numerical course grade using at least the usual grading scale (90-80-70-60, rounding grades to the nearest integer). If necessary, in the judgement of the instructor, a slightly more lenient grading scale may be used.

ACTIVITY	% of FINAL GRADE
Exams	60%
Homework	25%
Better of Exams and HW	15%

Course Content/Schedule

- Week 1: Temperature and Energy, Chap 1.1-1.3

- Week 2: Heat and Work, Chap 1.4-1.6
- Week 3: 2nd Law of Thermodynamics, Chap 2.1-2.4
- Week 4: Ideal Gas, Entropy, Chap 2.5-2.6, Exam 1
- Week 5-6: Interactions & Implications, Chap 3.1-3.6
- Week 7: Engines & Refrigerators, Chap 4.1-4.2, Exam 2
- Week 8-9: Boltzmann Statistics, Chap 6.1-6.4
- Week 10: Free Energies, Chap 5.1-5.2
- Week 11: Ideal Gas Revisited, Chap 6.5-6.7
- week 12-15: Quantum Statistics, Chap 7
- As scheduled by Registrars: Final Exam

University Policies

Disabilities Accommodations

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 believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Student Grade Appeals

As stated in university procedure 13.02.99.C0.03, Student Grade Appeals, a student who believes that their final grade reflects academic evaluation which is arbitrary, prejudiced, or inappropriate in view of the standards and practices outlined in the class syllabus, may appeal the final grade given for the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. Student are encouraged to first discuss their final grade with the instructor prior to filing a grade appeal. For complete details on the grade appeal process, including the timeline, please review university procedure [13.02.99.C0.03, Student Grade Appeals](#). For assistance and/or guidance in the grade appeal process, students may contact the Dean's/Director's office in the college/school in which the course is taught.

Campus Emergencies

At TAMU-CC, your safety is a top concern. We actively prepare for natural disasters or human-caused incidents with the ultimate goal of maintaining a safe and secure campus.

- For any emergency, dial the University Police Department (UPD) at **361-825-4444** or dial 911. It's a good idea to have the UPD emergency number (and non-emergency number 361-825-4242) saved in your cell phone.
- There are nearly 200 classroom telephones throughout campus. If you feel threatened or need help and don't have a cell phone, dial 4444 (emergency) or 4242 (non-emergency) to be connected to UPD.
- If we hear a fire alarm, we will immediately evacuate the building and proceed outside and away from the building a minimum of one hundred feet.
 - Proceed to the nearest building exit or evacuation stairway. Do not use the elevator. Persons who need help navigating stairs should proceed to a marked Area of Rescue Assistance, if possible.
 - Persons with disabilities should speak with their faculty about how to best assist them in case of an emergency.
 - Review the evacuation route (see posted building evacuation map).
- TAMU-CC employs the Code Blue Emergency Notification System, an alert system which connects the campus community during emergency situations.
 - The notifications include emails, text and pre-recorded messages, as appropriate.
 - Code Blue emergencies may include severe weather warnings, threats, school closures, delays, evacuations and other incidents which disrupt regular campus activities.
 - Students can update personal contact information anytime at the [Code Blue notification website](#).
- Shelter in Place via Code Blue.
 - "Shelter-in-place" means to take immediate shelter where you are and may be implemented for severe weather, hazardous material spills, active shooters or other dangerous situations.
 - If there is a shelter in place for a **tornado warning**, our preferred location is the bottom floor of this building, away from windows and doors.
- Active Threat Protocol. There are three things you could do that make a difference if there is an active threat: Run, Hide, and/or Fight. For more information about the Run, Hide, Fight protocol, including what to do when law enforcement arrives, visit **page 3** of the [Quick Reference Guide to Campus Emergencies](#).

For the *Quick Campus Guide to Campus Emergencies* (including a list of Areas of Rescue Assistance and additional protocols on assisting persons with physical disabilities, hurricanes, bomb threats, animal bites, crime reporting, elevator entrapment, etc.), visit [Quick Reference Guide to Campus Emergencies](#).

Civil Rights Reporting

Texas A&M University-Corpus Christi is committed to fostering a culture of caring and respect that is free from discrimination, relationship violence and sexual misconduct, and ensuring that all affected students have access to services. For information on reporting Civil Rights complaints, options and support resources (including pregnancy support accommodations) or university policies and procedures, please contact the [University Title IX Coordinator](#), ext. 5826, or visit the [Compliance Services Website](#)

Limits to confidentiality. Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, are not able to maintain confidentiality when it conflicts with their responsibility to report alleged or suspected civil rights discrimination that is observed by or made known to an employee in the course and scope of their employment. As the instructor, I must report allegations of civil rights discrimination, including sexual assault, relationship violence, stalking, or sexual harassment to the Title IX Coordinator if you share it with me. These reports will trigger contact with you from the Civil Rights/Title IX Compliance office who will inform you of your options and resources regarding the incident that you have shared. If you would like to talk about these incidents in a confidential setting, you are encouraged to make an appointment with counselors in the University Counseling Center.

College Policies

Statement of Academic Continuity

In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University-Corpus Christi; this course would continue through the use of Canvas and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Canvas) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

Academic Integrity/Plagiarism

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to

penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity, or plagiarism. (Plagiarism is the presentation of the work of another as one's own work.) The instructor of record determines the penalty for academic misconduct or complicity in an act of academic misconduct on an assignment or test.

Classroom/Professional Behavior

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

Statement of Civility

Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high-quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

Mental Health and Well-Being Services

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.



Dropping a Class

We hope that you never find it necessary to drop a class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and instructor, before you decide to drop a course.

Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, you must initiate the process by following the instructions on the [Registrar's Dropping/Withdrawing page](#). Please check the Academic Calendar for the last date to drop a class.

Academic Advising

The College of Science requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The Islander Advising Center is located in the Faculty Center 104 or can be reached at (361) 825-3453 or use the [Academic Advising email](#).

Artificial Intelligence Statement - AI

AI Prohibited – Students may not use Artificial Intelligence tools (such as ChatGPT or similar systems) for assignments, exams, or projects. All submitted work must be fully original and created by the student without AI assistance. Any use of AI will be considered academic misconduct.

Course Policies

Participation/Attendance/Tardiness

Attendance is necessary to do well in the class. Attendance may be **recorded**

occasionally and counted as homework points. A system will be developed to recognize attendance of asynchronous learners.

If you are late, please do your best not to disturb the class. If you must leave early, please warn me ahead of class so I don't get surprised while I'm talking.

Communication

I will communicate by in-class announcements, WTClass Announcements, and email (whatever account is attached to WTClass). It is expected that you engage with class by **checking Email and WTClass**. I'll assume that you have read announcements and content that I send by email or WTClass.

Keep your Local Facilitator informed about course topics and exams. They, along with your classmates, are your local help.

Please do email me with questions and requests for meetings. If something is interfering with your ability to work on the course, let me know early so I can help you figure out how to handle it.

Videoconference Etiquette

Please turn on your video. Seeing a screen of blank tiles is discouraging.

Keep your microphone muted to keep background noise from being sent to the entire class. Unmute your microphone whenever you need to ask a question.

Homework

Do your homework BEFORE the exam. Make sure you know how to solve each problem **from basic equations**, without following any solution guide.

Any requests for accommodating an excused absence must be made ASAP. Short (a day or two) extensions may be granted as long as you've contacted me before the solution set gets posted. Repeated extensions will come with a penalty of at least 10% per day.

Extensions aren't allowed beyond the Final.

Missed Quiz/Exam

Make-up exams will be given only under unavoidable circumstances. Make-up finals will only be given in extreme excusable circumstances, and if agreed to by the professor.

Cell Phone / Laptop Use

Please do not disturb the instructor or the rest of the class.
Do not talk on the phone in class.

Additional Policy Information

Since this is a Texas Physics Consortium course, please keep your Local Facilitator in the loop when exams are scheduled. Don't be afraid to talk to them about the course material!

IT Support Information

IT Support Information
361-825-2692 or 866-353-2491
Serviceportal.tamucc.edu

Campus Resources are provided within Canvas

General Disclaimer

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.