



CHEG 5305 P01: Chemical Engineering Thermodynamics
Spring 2024 Syllabus

General Course Information

Information Item	Information
Instructor:	Dr. Kazeem Olanrewaju
Section # and CRN:	P01 CRN 25127
Office Location:	C.L. Wilson 201 C
Office Phone:	936-261-9415 ; Cell Phone: 319-594-1861
Email Address:	kaolanrewaju@pvamu.edu ; olakab@gmail.com
Office Hours:	MWF 10:00 a.m. – 2:00 p.m.
Mode of Instruction:	Lecture
Course Location:	C L Wilson Engineering Bldg 103
Class Days & Times:	T 5:00 – 7:50 p.m.
Catalog Description:	(0-3) Credit 3 semester hours. This is a survey course starting with a review of thermodynamic laws then proceeding to examine ways that thermodynamics apply to various systems from static to dynamic, inert to reactive, and ultimately from abiotic to living systems. The approach will be to engage in readings (articles, book chapters, media releases), viewings (lectures, photos, videos), discussion, and project based design and evaluation activities.
Prerequisites:	Graduate Standing.
Co-requisites:	None
Required Text(s):	Introduction to Chemical Engineering Thermodynamics by J.M. Smith, et al, 8 th edition or newer. McGrawHill, 2018

Recommended Text(s):	<ol style="list-style-type: none"> 1. Chemical Thermodynamics for Process Simulation by Jurgen Gmehling, et al . Second Edition. Wiley-VCH 2019 2. Thermodynamic Inversion — Origin of Living Systems, Vladimir N. Kompanichenko (Springer International, Switzerland), ISBN 978-3-319535104, 2017 3. Non-equilibrium Thermodynamics and the Production of Entropy:Life, Earth, and Beyond. Axel Kleidon and Ralph D. Lorenz (Springer, New York), ISBN 9783540224952; 2004 4. Molecular Thermodynamics of Fluid-Phase Equilibria, 3rd Edition by John Prausnitz, Rudiger Lichtenthaler, and Edmundo Gomes de Azevedo, Prentice Hall, New Jersey; ISBN 0-13-9777745-8; 1999 5. Towards a Thermodynamic Theory for Ecological Systems, Sven Erik Jorgensen and Yuri M. Svirezhev (Elsevier, New York) ISBN 9780080441672, 2004
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Learning Objectives

A student who completes this course will have demonstrated the following.

- Ability to articulate knowledge of the three established thermodynamic laws as well as the emerging fourth law.
- An ability to apply thermodynamics understanding and solving problems relevant to natural and engineered systems
- An ability to analyze and interpret the findings of published works such as papers, book chapters, etc., in relation to thermodynamics, evolution and ecology.
- An ability to communicate original ideas orally and/or in written form relating thermodynamics and the origin of life.

Course Contents:

Week	Lecture Topic with reference	Assignments
Week 1:	Review of syllabus; course overview (table of contents); introduction. Pre-requisite skills inventory. Review of highlights from Chapters 1-5.	Review Ch. 1-5
Week 2:	Review of highlights from Chapters 1-5 (continued) 1 st Law, 2 nd Law, Ideal Gas Law	Read Chapter 6 HW 1 due
Week 3:	Review of highlights from Chapters 6-10 Thermodynamic Properties of Fluids; Applications of Thermodynamics to Flow Processes; Production of Power from Heat; Refrigeration and Liquefaction; Vapor/Liquid Equilibrium	
Week 4:	Review of highlights from Chapters 6-10 Thermodynamic Properties of Fluids; Applications of Thermodynamics to Flow Processes; Production of Power from Heat; Refrigeration and Liquefaction; Vapor/Liquid Equilibrium	HW 2 due

Week 5:	Solution Thermodynamics: Theory (Ch. 11)	Exam 1 (covers review)
Week 6:	Solution Thermodynamics: Theory (Ch. 11)	Read Chapter 7 HW 3 due
Week 7:	Solution Thermodynamics: Applications (Ch. 12)	Read Chapters 8 & 9
Week 8:	Solution Thermodynamics: Applications (Ch. 12)	Read Chapter 10 Mid-Term Exam HW 5 due 10
Week 9:	Thermodynamics Formulation for Vapor/Liquid Equilibrium (Ch. 13)	
Week 10:	Thermodynamics Formulation for Vapor/Liquid Equilibrium (Ch. 13)	Read Chapter 11 HW 6 due
Week 11:	Chemical-Reaction Equilibria (Ch. 14)	
Week 12:	Chemical-Reaction Equilibria (Ch. 14)	Read Chapter 12 HW 7 due
Week 13:	Topics in Phase Equilibria (Ch. 15)	
Week 14:	Topics in Phase Equilibria and Thermodynamic Analysis of Processes (Ch. 15 & Ch. 16)	HW 8 due
Week 15:	Last day of class (course review) Study day (no class).	1 lecture (review) Review & Study for Final Exam
Week 16:	Final Exam (comprehensive)	TBD

Performance Evaluation

Students are evaluated as follows, each item worth 25%.

1. Quizzes and Exercises
2. Partial Assessments (eg. Exams)
3. Final Assessment (eg. Exam)
4. Projects

There will be a 10% discount (up to a letter grade) on the overall score for the course in case of (unexcused) lack of participation, whether from absence, tardiness or disengagement.

The basis for exams will be lectures, quizzes, exercises and readings. Quizzes will be scheduled, except for pop quizzes which may be unannounced. Projects will be designed to allow students the opportunity to demonstrate their knowledge and ability gained (such as

through team based video recorded (YouTube style) presentations on assigned subjects (concepts and/or case studies).

The standard grading scale is used:

90-100=A

80-89 =B

70-79 = C

60-69 = D

< 59 = F

Use of a curve is at the instructor's discretion depending on the overall performance of the class.

Miscellaneous.

A grade of "I" will be considered for the course only if the conditions specified by the university are satisfied.

Note: If you have any needs that fall under the Americans with Disabilities Act, please inform me so that appropriate actions can be taken.

Please see the current university undergraduate and graduate catalogs for a summary of all university academic policies (available on the university's web site). This course will be conducted in accordance with these policies.

Finally, if you have any questions or concerns about the class, I will be happy to discuss them with you.

Student Support and Success John

B. Coleman Library

The library and its partners have as their mission to provide resources and instructional material in support of the evolving curriculum, as a partner in Prairie View A&M University's mission of teaching, research, and service and to support the University's core values of access and quality, diversity, leadership, relevance, and social responsibility through emphasis on ten key areas of service. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. Phone: 936-261-1500; Website: [J. B. Coleman Library](#).

Academic Advising Services

Academic Advising Services offers students a variety of services that contributes to student success and leads towards graduation. We assist students with understanding university policies and procedures that affect academic progress. We support the early alert program to help students get connected to success early in the semester. We help refer students to the appropriate academic support services when the student is unsure of the best resource for their needs. Some students are supported by faculty advisors in their respective colleges. Your faculty advisor can be identified in Panther Tracks. Advisors with Academic Advising Services are available to all students. We are located across campus. You can find your advisor's location by academic major at the [Academic Advising Website](#), Phone: 936261-5911.

The University Tutoring Center

The University Tutoring Center (UTC) offers free tutoring and academic support to all registered PVAMU students. The mission of the UTC is to help provide a solid academic foundation that enables students to become confident, capable, independent learners. Competent and caring staff and peer tutors guide students in identifying, acquiring, and enhancing the knowledge, skills, and attitudes needed to reach their desired goals. Tutoring and academic support is offered face-to-face in the [UTC, in virtual face-to-face sessions](#), and through [online sessions at PVPlace](#). Other support services available for students include Supplemental Instruction, Study Break, Academic Success Workshops, and Algebra Study Jam. Location: J. B. Coleman Library, Rm. 307; Phone: 936-261-1561; Email: pvtutoring@pvamu.edu; Website: [University Tutoring Center](#).

The Writing Center

The Writing Center provides well-trained peer tutors that assist students with writing assignments at any stage of the writing process. Tutors help students with various writing tasks from understanding assignments, brainstorming, drafting, revising, editing, researching, and integrating sources. Students have free access to Grammarly online writing assistance. Grammarly is an automated proofreading and plagiarism detection tool. Student must register for Grammarly by using their student email address. In addition, students have access to face-to-face as well as virtual tutoring services either asynchronously via email or synchronously via Zoom. Location: J. B. Coleman Library, Rm. 209; Phone: 936-261-3724; Website: [The Writing Center](#); [Grammarly Registration](#).

Academic Early Alert

Academic Early Alert is a proactive system of communication and collaboration between faculty, academic advisors, and PVAMU students that is designed to support student success by promptly identifying issues and allowing for intervention. Academic Early Alert helps students by providing a central location to schedule advising appointments, view advisor contact information, and request assistance. Students who recognize that they have a problem that is negatively affecting their academic performance or ability to continue school may self-refer an Academic Early Alert. To do so, students will log in to PVPlace and click on Academic Early Alert on the left sidebar. Phone: 936261-5902; Website: [Academic Early Alert](#).

Student Counseling Services

The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as crisis intervention, outreach, consultation, and referral services. The staff is licensed by the State of Texas and provides assistance to students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in accordance with Texas State Law. Location: Hobart Taylor, 2nd floor; Phone: 936-261-3564; Website: [Student Counseling Services](#).

Office of Testing Services Testing Services serves to create opportunities by offering suite of exams that aid in the students' academic and professional success. Currently we administer entrance (HESI A2), college readiness (TSI assessment), Prior Learning (CLEP, DSST), and proctored exams. Location: Wilhelmina Delco, 3rd Floor, Rm. 305; Phone: 936-2613627; Email: aetesting@pvamu.edu; Website: [Testing Services](#).

Office of Diagnostic Testing and Disability Services

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, contact the Office of Disability Services. As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops individualized ADA letters of request for accommodations. Other services include: learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hardware and software, adapted furniture, proctoring of non-standardized test administrations, ASL interpreters, ALDs, digital recorders, livescribe, and a comprehensive referral network across campus and the broader community. Location: Hobart Taylor, Rm. 1D128; Phone: 936-261-3583; Website: [Disability Services](#).

Center for Instructional Innovation and Technology Services (CIITS)

Distance Learning, also referred to as Distance Education, is the employment of alternative instructional delivery methods to extend programs and services to persons unable to attend college in the traditional manner. The Center for Instructional Innovation and Technology Services (CIITS) supports student learning through online, hybrid, webassisted and 2-way video course delivery. For more details and contact information, visit: [CIITS Student Webpage](#); Phone: 936-261-3283.

Veteran Affairs

Veteran Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazlewood Act. Location: Evans Hall, Rm. 102; Phone: 936-261-3563; Website: [Veteran Affairs](#).

Office for Student Engagement

The Office for Student Engagement delivers comprehensive programs and services designed to meet the cocurricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development and campus governance. Location: Memorial Student Center, Rm. 221; Phone: 936-261-1340; Website: [Office for Student Engagement](#).

Career Services

Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for information regarding services provided. Location: Anderson Hall, 2nd floor; Phone: 936-261-3570; Website: [Career Services](#).

University Rules and Procedures

Academic Misconduct (See Student Planner)

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Planner, especially the section on academic misconduct (see *University Administrative Guidelines on Academic Integrity*). Students who engage in academic misconduct are subject to university disciplinary

procedures. As listed in the PVAMU Undergraduate Catalog, Graduate Catalog, and the Student Planner, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed or to have attempted to commit the following academic misconduct may also be subject to disciplinary review and action as outlined in the PVAMU Student Planner.

Forms of Academic Dishonesty:

1. Cheating: Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving, or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a “cheat sheet” on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher. Submission of work done by another person. Receiving assistance from an individual or use of unauthorized device or materials while logged in for online assignments are all considered “cheating” by the instructor of record assigned to this course. Having other individuals in the room/location during an online quiz/exam proceeding except with permission of instructor is also considered under this category.

2. Plagiarism: Careless or deliberate use of the work or the ideas of another; representation of another’s work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another’s paper or answers, failure to identify information or essays from the Internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another

and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another’s words with quotation marks.

3. Multiple Submission: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

4. Conspiracy: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty.

5. Fabrication of Information/Forgery: Use or submission of contrived, invented, forged, or altered information in any assignment, laboratory exercise, or test; tampering with or production of a counterfeit document, particularly documents which make up the student’s academic record. Examples: making up a source or citing nonexistent publication or article; representing made up data as real for an experiment in a science laboratory class; forging a change of grade or student withdrawal record; falsifying any document related to a student academic exercise.

Nonacademic Misconduct (See Student Planner)

The University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor’s ability to conduct the class, or (2) the ability of students to benefit from the instructional program, or (3) the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Office for Student Conduct under nonacademic procedures.

Sexual Misconduct

Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university’s sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which the instructor becomes aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like

assistance, or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at the [Title IX Webpage](#) including confidential resources available on campus.

Pregnancy, Pregnancy-related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students' Office for additional information and to request accommodations. More information can be found at this [webpage](#).

Non-Discrimination Statement

Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity in its programs and activities. The University is committed to supporting students and complying with the Texas A&M University System nondiscrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of discrimination or harassment, we encourage you to report it. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the nondiscrimination policies, and can be reached at Harrington Science Building, Suite 109 or by phone 936- 2611744 or 1792.

Class Attendance Policy (See Catalog for Full Attendance Policy)

Prairie View A&M University requires regular class attendance. Attending all classes supports full academic development of each learner whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or internet. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University's attendance policy in each course syllabus.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students' rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the University Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint. Students can file Academic Complaints and/or Grade Appeals at this [webpage](#).

Technical Considerations

Minimum Recommended Hardware and Software:

- Intel PC or Laptop with Windows 10 or later version; Mac with OS High Sierra*
- Smartphone or iPad/Tablet with Wi-Fi*
- High speed Internet access
- 8 GB Memory
- Hard drive with 320 GB storage space
- 15" monitor, 800x600, color or 16 bit
- Sound card w/speakers
- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari or Firefox

*Smartphone, Google Chrome books and Android tablets may not be supported. iPads are the only tablets supported.

Note: Be sure to enable Java & pop-ups in the Web browser preferences

Participants should have a basic proficiency of the following computer skills:

- Sending and receiving emails
- A working knowledge of the Internet
- Microsoft Word (or a program convertible to Word)
- Acrobat PDF Reader
- Windows or Mac OS
- Video conferencing software

Netiquette (online etiquette)

Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussions boards. Foul or abusive language will not be tolerated. Do not use ALL CAPS for communicating to others AS IT CAN BE INTERPRETED AS YELLING. Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you." Limit and possibly avoid the use of emoticons. Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post and the message might be taken seriously or sound offensive. Students are also advised to be mindful of the tone of the electronic messages sent to the instructor. Addressing instructor with "hey" is also not acceptable under any circumstance. Emails formatted in this fashion will be returned for correction. In all matters and in cases of an emergency assistance will always be rendered in a timely fashion however this obvious error in judgment will not be overlooked.

Video Conferencing Etiquette

When using Zoom, WebEx or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during session. Before class session begins, test audio, video and lighting to alleviate technology issues.

Technical Support

Students should go to the [Password Reset Tool](#) if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Center for Instructional Innovation and Technology Services (CIITS) at 936-261-3283 or email ciits@pvamu.edu.

Students can click the Resources button in the Canvas Navigator to see a list of support resources. This tab also contains a link to several training and tutorial videos and a FAQ page to help you navigate and troubleshoot issues in Canvas. The Support Hotline and Chat will connect you to real-time Canvas support from Instructure (24/7). To get assistance, you can

- call (936) 261-3283
- Email ciits@pvamu.edu

For text or course material support you access the [Library](#), [Bookstore](#), or the publisher website. For assistance with third-party applications, please refer to their individual technical support resources. Some useful sites for applications such as Zoom and Respondus are listed below:

- Respondus- <https://web.respondus.com/student-help/>
- Zoom- <https://support.zoom.us/hc/en-us>

Communication Expectations and Standards

Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Instructor feedback on assignments will usually be available within 3 days from the close date of the assignment. When contacting your instructor, please follow professional communication guidelines. Please include your name and your course name and section in email communications. Email communications must be held at reasonable, respectable hours (BEFORE 8pm). Check regularly for responses.

Discussion Requirement

Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can take place in a seminar fashion. This will be accomplished by the use of the discussion board. The exact use of discussion will be determined by the instructor.

It is strongly suggested that students type their discussion postings in a word processing application such as Word and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, copy and paste to the discussion board.

COVID-19 Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the COVID-19 pandemic, Prairie View A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.
- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all nonprivate spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain.
- **Physical Distancing** - Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- **Classroom Ingress/Egress** - Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Students should leave classrooms promptly after course activities have concluded, should not congregate in hallways and should maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- **Face-to-face Class** - To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Office for Student Conduct for adjudication. Additionally, the faculty member may choose to teach that day's class remotely for all students.
- **COVID-19 Guidelines for Student Conduct Adjudication** - The mandatory COVID-19 Training/Certification taken by all students serves as the 1st Warning for violation of COVID-19 Guidelines.
 - 1st incident: upon review of Incident Report and finding of responsibility — Conduct Probation
 - 2nd incident: upon review of Incident Report and finding of responsibility — Suspension

- Consult the Code of Student Conduct in the Student Planner or [Student Conduct website](#) for additional information on Conduct Probation and Suspension.

• **Personal Illness and Quarantine** - Students required to quarantine must participate in courses and courserelated activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive

an excused absence, students must provide appropriate documentation to the Office for Student C