Identification	**Subject**	Thermodynamics A	
	Department	Chemistry and Chemical Engineering	
	Program	Undergraduate	
	Term	Spring 2024	
	Instructor	Gabil Aliyev	
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	Phone	+99451 244 36 27	
	Classroom/hours	302N/18:40-20:10,20:20-21:00	
	Office hours		
Prerequisites			
Language	English		
Compulsory/Elective	Compulsory		
Required textbooks and course materials	▪ Elements of Physical Chemistry (5th edition) written by Peter Atkins and Julio de Paula in pdf published in 2009 [1] ▪ Elementary Principles of Chemical Processes (3rd edition) written by Richard M. Felder and Ronald W. Rousseau in pdf published in 2005 [2] ▪ Thermodynamics, an engineering approach written by Yunus A. Chengel, Michael A. Boles, Mehmet Kanoglu in pdf published in 2019 [3]		
Website of course	This course is based on traditional face-to-face classes.		
Teaching methods	**Lecture**	**X**	
	Group discussion	**X**	
	Practical tasks	**X**	

Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Activity		5
	Quiz	4th and 11th week	15
	Midterm Exam	TBA	30
	Case study	13th week	10
	Final Exam	TBA	40
	Total		100
Course outline	This course introduces the fundamental concepts of classical thermodynamics and their application to solve problems encountered in chemical engineering processes. It emphasizes the first and second laws of thermodynamics, property relationships, and their use in various calculations. Students will also get a chance to work on some real-life cases. Using different property tables and charts will be key for the course.		

Course objectives	The following are common course objectives that are typically associated with Thermodynamics • Apply the first and second laws of thermodynamics to analyze chemical processes. • Understand and utilize key thermodynamic properties like enthalpy, entropy, and internal energy. • Employ equations of state for ideal and real gases. • Perform thermodynamic cycles analysis. • Solve problems related to work, heat transfer, and energy balances.
Learning outcomes	Here are some common learning outcomes associated with thermodynamics courses: • Apply the first and second laws of thermodynamics to analyze chemical processes. • Understand and utilize key thermodynamic properties like enthalpy, entropy, and internal energy. • Employ equations of state for ideal and real gases. • Perform thermodynamic cycles analysis. • Solve problems related to work, heat transfer, and energy balances. • Critically evaluate the limitations of various thermodynamic models. • Utilize thermodynamic data and property tables to solve engineering problems.
Policy	• **Participation** For a variety of reasons, participation in a classroom context is essential. It is essential to the learning process, promotes teamwork, and aids in the general success of both the individual students and the class as a whole. • **Case Study/Report** Students will be presented with an opportunity to work on a real-life case in an oil and gas plant. They have to use their critical analysis and engineering knowledge to understand the case and try to solve by applying what they learnt during thermodynamics course. They must present a report to explain their reasoning. • **Activity** The students should participate in all the classes. However class activity will mainly depend on the level of interaction of the student during the lectures. • **Quiz** A consistent method of gauging your understanding of the content covered in class is through quizzes. They assist you and your teacher in evaluating your comprehension of important ideas and identifying any areas that can benefit from more explanation. Each quiz will consist of 5 questions, and each question will be marked with 10 points. There will be two quizzes. • **Withdrawal (pass/fail)** The School Science and Engineering grading guidelines are carefully adhered to throughout this course. To pass, a student must typically receive a mark of at least 60%. If the student fails, the course. • **Cheating/plagiarism** Any form of plagiarism or cheating on a test, quiz, or project will result in the cancellation of the assignment. In this scenario, the student will receive a score of zero (zero) without any further consideration. • **Illness** Student with an illness may miss a quiz or presentation. This might be because the student needs to go to the hospital, recover at home, or attend regular medical appointments. In this case, the student must inform the instructor in advance about the illness and must present a document from their doctor. After considering the situation, the instructor may set a new date for the quiz or

	project presentation. Only one opportunity will be given to the student. The students who don't inform the instructor in advance will not be given a chance to retake the quiz or give a presentation. • **Professional behavior guidelines** During class hours, students are expected to conduct themselves in a way that fosters a positive academic and professional atmosphere. Discussions without permission and unethical conduct are absolutely forbidden. • **Ethics** In class, students must not be late. During class, mobile phones must be put away and turned off.

Tentative Schedule		
Weeks	**Topics**	**Reference books**
1	Introduction to Thermodynamics	[3] Chapter 1
2	Energy and First Law of Thermodynamic	[1] Chapter 3
3	Properties of Pure Substances	[1] Chapter 5
4-5	Equations of State, Second Law of Thermodynamics	[3] Chapter 6
6	Power cycles, Refrigeration cycle	[3] Chapter 9
7	**Midterm exam**	
8	Properties of Mixtures, Phase Equilibrium	[1] Chapter 6
9	Reaction Equilibrium	[1] Chapter 7
10	Applications of Reaction Equilibrium	[1] Chapter 7
11	Thermodynamics of Flow Processes	[3] Chapter 17
12	Applications in Flow Systems	[3] Chapter 17
13	Thermodynamics of Separation Processes	[3] Chapter 16
14	Applications of Thermodynamics in Energy Systems	[2] Chapter 7
15	Introduction to Property Tables and Charts	[2] Appendix B
Final Exam		