

CHEN 6975 - Advanced Chemical Engineering Thermodynamics

Fall 2026 Syllabus, Section 01, CRN 43816,

Credit hours: 3

Instructor

Zhuanzhuan Xie

Email: zxie01@ysu.edu

Public Instructor Information

Instructor Title: Senior Lecturer

Instructor Professional Qualifications: Ph. D., Chemical Engineering, The University of Kansas, 2013

Instructor Office Location: Moser Hall 2068

Instructor Office Phone: 330-941-3019

Course Description

6975. Advanced Chemical Engineering Thermodynamics. Development of the concepts and formalisms of thermodynamics and their applications to chemical engineering systems. Real and ideal behavior of single and multicomponent systems. Introduction to the thermodynamics of phase equilibria. Prereq.: C or better in CHEN 3771, C or better in MATH 3705 or MATH 3705H. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Fundamentals of Chemical Engineering Thermodynamics	Kevin D. Dahm and Donald P. Visco, Jr.	1111580707
Optional	Molecular Thermodynamics of Fluid-Phase Equilibria	J. M Prausnitz, R. Lichtenthaler and E. Gomez de Azevedo	0139777458
Optional	Introduction to Chemical Engineering Thermodynamics	J. M. Smith, H. C. Van Ness and M. M. Abbott	1260721477

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Tentative Course Schedule

Week of	Reading(s)	Proposed Topic	Due/To Prepare for Class
8/24	Slide 1	Thermodynamics review; Laws of thermodynamics	
8/31	Slide 2	Thermodynamic properties	
9/7	Slide 3	Modeling pure component phase equilibrium	No class 9/7: Labor Day
9/14	Slide 4	Mixture thermodynamics	
9/21	Slide 5	Modeling vapor-liquid equilibrium (VLE): Introduction	
9/28	Slide 5	Modeling VLE: Ideal gas phases	
10/5	Slide 6	Modeling VLE using equations of state: gamma-phi	
10/12	Slide 6	Modeling VLE using equations of state: phi-phi	
10/19	Slide 7	Liquid-liquid equilibrium (LLE)	
10/26	Slides 1-6	Midterm Exam: VLE	

11/2	Slide 7	Modeling LLE	
11/9	Slide 8	Vapor-liquid-liquid equilibrium (VLLE)	
11/16	Slide 8	Solid-liquid equilibrium (SLE)	
11/23	Slide 9	Chemical Reaction Equilibrium	No Class 11/25 – 11/27: Thanksgiving Holiday
11/30	Slide 9	Chemical Reaction Equilibrium	
12/7	Slides 7-9	Final Exam: LLE, SLE, and chemical reaction equilibrium	

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.