

Spring 2021

## CHE 611-102: Thermodynamics

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# ChE-611: THERMODYNAMICS

Spring 2021

This course begins with reviewing the laws of thermodynamics. Specific focus is on phase equilibria, including liquid-gas, liquid-liquid, and solid-liquid systems. Students learn to develop and use phase diagrams, analyze complex thermodynamic systems, including those experiencing chemical reactions. Foundations of the statistical thermodynamics are introduced. Students learn using common thermodynamic references, including NIST Chemistry Webbook. Finally, energy and exergy-based analytical approaches are compared as related to engineering applications.

Instructor: Prof. E.L. Dreizin, [dreizin@njit.edu](mailto:dreizin@njit.edu)

Office hours by appointment

Text: D. A. McQuarrie, J. D. Simon. [Molecular Thermodynamics](#). University Science books, Sausalito, CA, 1999.

ISBN 1-891389-05-X

Reference: [Introduction to Chemical Engineering Thermodynamics](#) by J.M. Smith, H.C. Van Ness, M.M. Abbott; M.T. Swihart, 9th edition, 2022

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Topics by weeks, approximate breakdown

<b>Topic #</b>	<b>TOPICS</b>
1	Intro; Zeroth Law; First Law
2	Properties of fluids, Equations of state
3	Entropy, Second Law
4	Third Law; T/D potentials, Maxwell Relations; <i>Project groups formed</i>
Q1	Quiz
5	Intro to phase equilibria, chemical potential, fugacity
6	Vapor-Liquid Equilibrium; Intro to Liquid-Liquid Solutions
7	Activity; Solutions; <i>Project topics selected</i>
8	Solid-Liquid Solutions, Colligative Properties
Q2	Quiz
9	Chemical Equilibrium
10	Exergy or availability
P	Project presentations
C	Review/Consultation