



ChE 501 - Intermediate Thermodynamics/Transport Properties Fall 2007

Instructor Richard L. Long, Jr., Ph.D., P.E. , Professor

Course Description

Foundations of classical thermodynamics. The set of thermodynamic laws derived from empirical observations and their application to engineering systems. Development of property data for real fluids as necessary for system analysis. Chemical engineering graduate majors must make a "B" or better.

Course Prerequisite

ChE 441 or its equivalent

Required Text

Tester, J.W. and Modell, M., "Thermodynamics and Its Applications", 3rd Edition, Prentice Hall, Upper Saddle River, NJ, 1997

References

- + S.I. Sandler, "Chemical and Engineering Thermodynamics", 3rd Edition, 1999, John Wiley & Sons, New York, NY
- + J. M. Smith & H.C. Van Ness, "Introduction to Chemical Engineering Thermodynamics", 4th Edition, 1987, McGraw-Hill Book Company, New York, NY

Course Objectives

At the end of this course, the student will be able to:

- + for a given process with prescribed (or idealized) internal constraints and boundary conditions, calculate how the physical properties of the systems vary
- + calculate what external interactions must be imposed to cause given changes in system properties
- + of the many alternative processes to effect a given change in a system, calculate what are the efficiencies of each with respect to the resources at our disposal
- + evaluate when real fluid properties are required and calculate the appropriate values for the given system
- + from a partition function, derive a corresponding equation of state.
- + determine conditions of equilibrium and stability and the differences between them
- + apply Legendre transformations to obtain desired partial derivatives, particularly in terms of measurable quantities.

Topics Covered

Part I - Fundamental Principles, Chapters 1, 2, 3, 4, 5, & 6 (text)
Part II - Thermodynamic Properties, Chapters 8, 9, 11, 12, & 13 (text)
Part III - Applications, Chapters 15 & 16 (text)

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Class Schedule

TuTh, 2:35 - 3:50 p.m., JH 207

Contribution to Meeting Professional Component

Thermodynamics is one of the core disciplines of chemical engineering and is basic for professional development at the graduate level.

Relationship to Program Objectives

An intermediate graduate course in thermodynamics is one of the program objectives for graduate education in chemical engineering.

Grading

Work appropriate for graduate education will be required.

Attendance Policies

Attendance is required for all exams. Zero points will be assigned to any exam missed. Make-up exams will be given only if a valid excuse, satisfactory to the instructor, is presented. If a student arrives late for an exam, the student must still complete the test at the same time as the other students, unless a valid and satisfactory excuse is presented.

ADA Statement

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of Disabled Student Programs located at Garcia Annex (Phone: 646-1921). Appropriate accommodations may then be provided for you. If you have a condition that may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of the Americans With Disabilities Act Coordinator at 646-7795.

Note

All students are required to abide by the NMSU Code of Conduct. Any inappropriate behavior, especially academic misconduct, will not be tolerated.

Prepared by

Richard L. Long, Jr., August 21, 2007