



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Engineering Thermodynamics

MECHENG 5502

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Technical elective in Engineering Thermodynamics including exergy analysis, non-reacting and reacting gas mixtures, combustion, psychrometrics, chemical and phase equilibrium, thermoeconomics and applications.

Prerequisites and Co-requisites:

Prereq: 3501 (501) or 3502, or equiv.

Course Goals / Objectives:

- Apply exergy analysis principles
 - Apply non-reacting gas mixture principles, including psychrometrics
 - Apply reacting gas mixture principles, including combustion
 - Apply concepts of thermodynamic, chemical and phase equilibrium and determine equilibrium composition
 - Apply energy balances for reacting systems
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Course Topics:

- Review (1st Law, 2nd Law, Use of properties)
 - Exergy Principles
 - Thermoconomics
 - Partial molal properties
 - Chemical potential
 - Fugacity
 - Ideal solutions and gas mixtures and analysis of systems involving nonreactive ideal gas mixtures
 - Psychrometric principles and analysis of air-conditioning processes
 - Principles of combustion
 - Enthalpy of formation
 - Energy balances for reacting systems
 - Heating values and adiabatic flame temperature
 - Absolute entropy, 3rd Law, Gibbs function of formation and chemical exergy
 - Principles of thermodynamic equilibrium, equation of reaction equilibrium and equilibrium constant
 - Calculating equilibrium compositions for reacting ideal gas mixtures
 - Equilibrium flame temperature, ionization, simultaneous equations
 - Phase equilibrium
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Designation:

Elective