

The University of New Mexico
Department of Mechanical Engineering
Thermal System Design and Optimization
(ME 421/521)

Instructor: A. Razani

Office: ME 332

Text: Thermal Design and Optimization

A. Bejan, G. Tsatsaronis and M. Moran
John Wiley & Sons, Inc., New York, 1996.

Description: This course builds on the basic knowledge of thermodynamics, heat transfer and fluid mechanics and provides a comprehensive introduction to thermal systems design and optimization based on second law of thermodynamics. It also includes optimization of thermal systems under constraints of finite size and finite time processes. Examples from different areas of thermal science and engineering such as, heat exchangers, heat transfer enhancement, energy storage, thermal insulation, cryogenics, micro-electronic cooling, power, refrigeration and direct energy conversion systems will be covered in the course. The course includes an introduction to thermoeconomic analysis and optimization.

Tentative Course Outline:

<u>Topics</u>	<u>No. Of Lectures</u>	<u>Chapters</u>
Introduction	3	1
Optimization Techniques	4	9.4 + Notes
Thermodynamics, Modeling and Design Analysis	6	Chapter 2
Exergy Analysis	6	Chapter 3
Heat Transfer, Modeling and Design Analysis	5	Chapter 4
Midterm	1 hr	
Application with Thermodynamics and Heat and Fluid Flow	8	Chapters 5 and 6
Thermodynamics of Finite-Size and Finite Time Processes	5	Notes
Thermoeconomic Analysis and Evaluation	6	Chapters 7 & 8
Final Exam	2 hrs.	

Grading Policy: The final grade in the course will be based on homework assignments, a project, a midterm exam, and a final. These will be weighted as follows:

Homework and Project*	30%
Midterm	30%
Final Exam	40%

*You may cooperate during the process of determining an analytical approach for a problem, but the solution and writing must be done individually.