

## Course Number: PHYS 690

## Course Title: Thermodynamics Engineering

**Instructor:** Prof. Rainald Löhner

**Brief Description:** This course is intended to familiarize the audience with the basic concepts used in engineering when dealing with thermodynamic problems. At the end of the semester, the students will/must be able to understand and compute basic thermodynamic cycles such as power generation and refrigeration, and be familiar with such concepts as equations of state, phase changes, latent heat, internal energy, enthalpy and entropy, Carnot cycles, and the thermodynamics of power generation, internal combustion engines and refrigeration processes.

### Requirements:

- Graduate Standing or Permission of Instructor

**Location:** Exploratory Hall, Room 1007

**Time:** Friday 4:30pm

## PHYS690 (Engineering Thermodynamics): Contents

### Contents

- Introduction
- Fundamental Concepts
- Equations of State
- First Law of Thermodynamics
- Consequences of First Law
- Carnot Cycle
- Enthalpy
- Second Law of Thermodynamics
- Entropy
- Combined First and Second Laws
- Fluid Flow
- Heat Transfer
- Mixtures of Gases and Vapors
- Vapor Power Cycles
- Thermodynamics of Internal Combustion Engines
- Refrigeration Processes
- Thermodynamics of Reactive Systems (Time Permitting)

### Textbooks

- J.F. Lee and F.W. Sears - Thermodynamics - An Introductory Text for Engineering Students; Addison Wesley
- E.P. Gyftopoulos and G.P. Beretta - Thermodynamics - Foundations and Applications; Dover

## **PHYS690 (Engineering Thermodynamics): Teaching and Evaluation**

### **Evaluation**

- Mid-Term Exam
- Final Exam
- Exams Are Closed Book (Instructor Believes in Having the Basic Information Required to Operate in One's Brain, Not in the Cloud)

### **Methods of Instruction**

- Overheads, Blackboard
- Notes posted in Student-Accessible Directory