

**ÇANKAYA UNIVERSITY  
FACULTY OF ENGINEERING  
MECHANICAL ENGINEERING DEPARTMENT**

**ME 212 THERMODYNAMICS-II  
SYLLABUS  
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**Week 1-2:**

**CHAPTER 8.VAPOR POWER SYSTEMS**

- 8.1 Modeling Vapor Power Systems
- 8.2 Analyzing Vapor Power Systems-Rankline Cycle
- 8.3 Improving Performance-Superheat and Reheat
- 8.4 Improving Performance-Regenerative Vapor Power Cycle
- 8.5 Other Vapor Cycle Aspects
- 8.6 Case Study: Exergy Accounting of a Vapor Power Plant

**Week 3-4:**

**CHAPTER 9.GAS POWER SYSTEMS**

**Internal Combustion Engines**

- 9.1 Introducing Engine Terminology
- 9.2 Air-Standard Otto Cycle
- 9.3 Air-Standard Diesel Cycle
- 9.4 Air-Standard Dual Cycle

**Gas Turbine Power Plants**

- 9.5 Modeling Gas Turbine Power Plants
- 9.6 Air-Standard Brayton Cycle
- 9.7 Regenerative Gas Turbines
- 9.8 Regenerative Gas Turbines with Reheat and Intercooling
- 9.9 Gas Turbines for Aircraft Propulsion
- 9.10 Combined Gas Turbine-Vapor Power Cycle
- 9.11 Ericsson and Stirling Cycles

**Week 5-6:**

**CHAPTER 10.REFRIGERATION AND HEAT PUMP SYSTEMS**

- 10.1 Vapor Refrigeration Systems
- 10.2 Analyzing Vapor-Compression Refrigeration Systems
- 10.3 Refrigerant Properties
- 10.4 Cascade and Multistage Vapor-Compression Systems
- 10.5 Absorption Refrigeration
- 10.6 Heat Pump Systems
- 10.7 Gas Refrigeration Systems

**Week 7-8:**

CHAPTER 11.THERMODYNAMIC RELATIONS

- 11.1 Using Equations of State
- 11.2 Important Mathematical Relations
- 11.3 Developing Property Relations
- 11.4 Evaluating Changes in Entropy, Internal Energy, and Enthalpy
- 11.5 Other Thermodynamic Relations
- 11.6 Constructing Tables of Thermodynamic Properties
- 11.7 Generalized Charts for Enthalpy and Entropy
- 11.8 p-v-T Relations for Gas Mixtures
- 11.9 Analyzing Multicomponent Systems

**Week 9-10:**

CHAPTER 12.IDEAL GAS MIXTURES AND PSYCHROMETRICS APPLICATIONS

Ideal Gas Mixtures: General Considerations

- 12.1 Describing Mixture Composition
- 12.2 Relating p, V, and T for Ideal Gas Mixtures
- 12.3 Evaluating U,H,S and Specific Heats
- 12.4 Analyzing Systems Involving Mixtures

Psychrometric Applications

- 12.5 Introducing Psychrometric Principles
- 12.6 Psychrometers: Measuring the Wet-Bulb and Dry-Bulb Temperatures
- 12.7 Psychrometric Charts
- 12.8 Analyzing Air-Conditioning Processes
- 12.9 Cooling Towers

**Week 11-12:**

CHAPTER 13.REACTING MIXTURES AND COMBUSTION

Combustion Fundamentals

- 13.1 Introducing Combustion
- 13.2 Conservation of Energy-Reacting Systems
- 13.3 Determining the Adiabatic Flame Temperature
- 13.4 Fuel Cells
- 13.5 Absolute Entropy and the Third Law of Thermodynamics

Chemical Exergy

- 13.6 Introducing Chemical Exergy
- 13.7 Standard Chemical Exergy
- 13.8 Exergy Summary
- 13.9 Exergetic (Second Law) Efficiencies of Reacting Systems

**Week 13-14:**

CHAPTER 14.CHEMICAL AND PHASE EQUILIBRIUM

Equilibrium Fundamentals

- 14.1 Introducing Equilibrium Criteria
- Chemical Equilibrium
- 14.2 Equation of Reaction Equilibrium

- 14.3 Calculating Equilibrium Compositions
- 14.4 Further Examples of the Use of the Equilibrium Constant
- Phase Equilibrium
- 14.5 Equilibrium Between Two Phase of a Pure Substance
- 14.6 Equilibrium of Multicomponent, Multiphase Systems