

# El Paso Community College

## Syllabus

### Part II

## Official Course Description

|                                 |   |
|---------------------------------|---|
| <b>SUBJECT AREA</b>             | <u>Engineering</u>                                      |
| <b>COURSE RUBRIC AND NUMBER</b> | <u>ENGR 2334</u>  |
| <b>COURSE TITLE</b>             | <u>Introduction to Thermal Fluids</u>                   |
| <b>COURSE CREDIT HOURS</b>      | <u>3      3      :      0</u><br>Credits   Lec      Lab |

### I. Catalog Description

Introduces the fundamental concepts of energy and thermodynamics (e.g., temperature, thermodynamic equilibrium, and heat). Emphasizes the techniques in the application of the fundamentals of thermodynamics to various processes as they frequently occur in chemical and biomolecular engineering. Provides the basic skills and tools necessary in designing and analyzing real-life engineering systems. Serves as preparation for other advanced course in thermodynamics, energy conversion, heat transfer, etc.

**Prerequisite: ENGR 2302 with a grade of “C” or better and may be taken concurrently with ENGR 2334. (3:0).**

### II. Course Objectives

Upon satisfactory completion of this course, the student will be able to

- A. Apply the first law of thermodynamics to systems.
- B. Solve problems using the second law of thermodynamics.
- C. Solve problems using Bernoulli’s equation.
- D. Solve problems applying the buoyancy and Archimedes principle.
- E. Design simple systems using hydrodynamics of fluids.
- F. Solve problems using the properties of gases, internal energy, and heat.
- G. Solve problems that include temperature, saturation pressure, and enthalpy using the tables for refrigerant 134a, ideal gases, superheated water, and compressed liquid air.
- H. Solve problems that include molar mass, gas constant, temperature, pressure, and volume at critical points using the tables for different substances and common gases.

### III. THECB Learning Outcomes (ACGM)

Upon successful completion of this course, students will:

1. Apply knowledge of math, engineering, and science to perform energy calculations of engineering systems and analyze the feasibility of the processes undergone by the systems.
2. Describe basic thermodynamic properties and their interrelationships.
3. Describe basic states of matter (solid, liquid, gas).
4. Define units of pressure, temperature, density, mass, and moles, SI and English system, and use conversions.
5. Use thermodynamic tables and diagrams and apply equations of state, such as the Ideal Gas Law.
6. Distinguish between steady-state and transient processes, open and closed systems.
7. Describe the meaning of specific volume, enthalpy, and internal energy and how to obtain them from thermodynamic tables and diagrams.

8. Apply first- and second-law analysis to thermodynamic processes and cycles.
9. Analyze systems, process feasibility, and efficiency for open and closed systems.
10. Define the meaning of isentropic processes; obtain entropy from thermodynamic tables and diagrams.

#### **IV. Evaluation**

##### **A. Grading**

It is recommended that four examinations be given, including the final examination. Quizzes and/or homework may also be assigned, and those grades may be included in the final average. The weight given to exams, quizzes, and homework is at the discretion of the instructor.

Grades will be assigned based on a student's average using the scale below:

- A = 90 - 100%
- B = 80 - 89%
- C = 70 - 79%
- D = 60 - 69%
- F = Below 60%

##### **B. I and W Grades**

Incomplete (I) grades will be given at the instructor's discretion and only under special circumstances. The instructor is not obligated to issue a "W" (Withdrawal) grade. Students who wish to withdraw must submit the proper paperwork to the registrar prior to the "drop" deadline. A grade of "W" cannot be issued at the end of the semester.

#### **V. Disability Statement (Americans with Disabilities Act [ADA])**

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

#### **VI. 6 Drop Rule**

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.