



蘇州大學  
Soochow University

## ENR 260 Thermofluids

Summer 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

### **COURSE OBJECTIVES**

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Thermofluids engineering integrates the fundamental principles of thermodynamics, heat transfer, and fluid mechanics into a unified subject aimed at the design and analysis of thermal systems. This course provides students with a comprehensive understanding of the interconnection of these disciplines and their application in real-world scenarios. Topics include fundamentals of thermodynamics, First and Second Laws of Thermodynamics, heat transfer modes including steady and unsteady conduction, convection and radiation, flow statics and buoyancy, mass, momentum and energy conservation, Bernoulli equations, internal and external flows.

Upon Completion of this Course, students will be able to:

1. Understand the fundamental principles of thermodynamics, heat transfer, and fluid mechanics;
2. Apply the First and Second Laws of Thermodynamics to analyze energy systems and processes;
3. Evaluate heat transfer modes including conduction, convection, and radiation in steady and unsteady conditions;
4. Apply principles of flow statics and buoyancy to analyze fluid behavior;
5. Apply mass, momentum, and energy conservation principles to analyze fluid flow;
6. Analyze internal and external flows in thermal systems.

### **PREREQUISITES**

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CEN 105 Introduction to Statics



## GRADING

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Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
5 Labs and Reports	50 Points
2 Quizzes	20 Points
Midterm Exam	15 Points
Final Exam	15 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

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### Required Texts:

Cengel, Y. A., Turner, R. H. & Cimbala, J. M., (2017). *Fundamentals of thermal-fluid sciences*. McGraw-Hill.

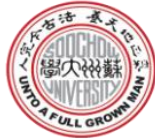
### Recommended (Optional) Texts or Other Materials:

None

## COURSE TOPICS

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MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Basic Concepts of Thermodynamics Topic 2: Energy, Energy Transfer, and General Energy Analysis Topic 3: Properties of Pure Substances Topic 4: Energy Analysis of Closed Systems <b>Assessments:</b> Lab #1 Lab Report #1



Module 2	<b>Topics:</b> Topic 5: Mass and Energy Analysis of Control Volumes Topic 6: The First and Second Law of Thermodynamics Topic 7: Entropy Topic 8: Power and Refrigeration Cycles <b>Assessments:</b> Lab #2 Lab Report #2 Quiz #1
Module 3	<b>Topics:</b> Topic 9: Introduction and Properties of Fluids Topic 10: Fluid Statics Topic 11: Bernoulli and Energy Equations Topic 12: Momentum Analysis of Flow Systems <b>Assessments:</b> Lab #3 Lab Report #3 Midterm Exam
Module 4	<b>Topics:</b> Topic 13: Internal Flow Topic 14: External Flow Topic 15: Mechanisms of Heat Transfer Topic 16: Heat Exchangers <b>Assessments:</b> Lab #4 Lab Report #4 Quiz #2
Module 5	<b>Topics:</b> Topic 17: Steady Heat Conduction Topic 18: Transient Heat Conduction Topic 19: Forced Convection Topic 20: Natural Convection <b>Assessments:</b> Lab #5 Lab Report #5 Final Exam

## ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.



Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

## **LEARNING REQUIREMENTS**

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

## **TECHNOLOGY POLICY**

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

## **ACADEMIC INTEGRITY POLICY**

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors



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and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

## **DISABILITY ACCOMMODATION**

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.