

## Instructor Information

**Name**

Yang Chao

**Email**

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**Student Hours/Office Hours**

Mon/Wed/Fri 1100-1200, or by appointment

**Office Location**

M Building Office 114



**Heat Transfer DB-ES 403**

**Section(s): 01DB**

**Daytona/Prescott 2022 Spring**

## Catalog Course Description

One- and two-dimensional steady and unsteady state conduction heat transfer including an introduction to finite-difference and finite-element methods of analysis. Free and forced convection heat transfer. Radiation heat transfer.

## Course Information

Academic Term: Daytona/Prescott 2022 Spring

Term Dates: Jan 12, 2022 - May 5, 2022

Credit Hours: 3

Mode of Delivery: In Person

Class Meetings: 10:00 AM - 10:50 AM Monday, Wednesday, Friday

Location: M BLDG 136

## Course Goals

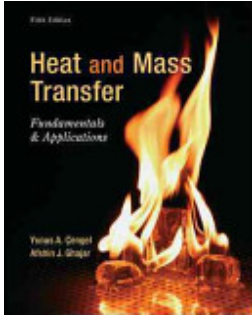
This class is designed to familiarize the student with the basic concepts of heat transfer (conduction, convection and radiation) and stimulate critical thinking skills. Emphasis is placed on methods lending themselves to computer implementation (finite-difference method).

## Student Learning Outcomes

1. Distinguish and understand the three heat transfer modes, conduction, convection and radiation.
2. Determine closed-form and numerical solution for 1-D conduction problems.
3. Determine closed-form and numerical solution for 2-D conduction problems.
4. Be able to determine heat transfer of simple geometries due to convection.
5. Be able to solve radiation between multiple black and grey bodies.

Prerequisite(s): ES 403 Prerequisite is ES 309 or AE 307.

## Required Course Materials



**Text/Tool: Heat and Mass Transfer: Fundamentals and Applications**

ISBN: 9780073398181

Authors: Yunus Cengel, Afshin Ghajar

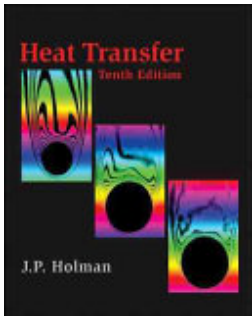
Publisher: McGraw-Hill Education

Publication Date: 2014-04-04

**Notes**

This is the required textbook for ES403.

## Optional Course Materials



**Text/Tool: Heat Transfer**

ISBN: 9780073529363

Authors: Jack P. Holman

Publisher: McGraw-Hill Education

Publication Date: 2009-01-13

**Notes**

This book is used for graduate level heat transfer study. Not required for ES403.

## Tentative Schedule

1D S. S. Heat Conduction **HW 1, Quiz 1**

Internal Energy Generation and Boundary Conditions **HW 2, Quiz 2**

**Exam 1**

Transient Heat Conduction **HW 3, Quiz 3**

Fins **HW 4, Quiz 4**

**Exam 2**

External Convection **HW 5, Quiz 5**

Internal Convection **HW 6, Quiz 6**

**Comprehensive Final Exam**

## Assessment Activities

Exam 1	22.5%
Exam 2	22.5%
Comprehensive Final Exam	30%
Quizzes	15%
Homework	10%

## Grading

Letter Grade	Percentage
A	90 - 100%
B	80 - 89%
C	70 - 79%
D	60 - 69%
F	< 60%

## University Policies

### ACADEMIC INTEGRITY

Embry-Riddle is committed to maintaining and upholding academic integrity. Academic integrity violations include cheating, fraud, plagiarism, and double-submissions. More specific definitions of these violations and their consequences are described in the Dean of Students' [Honor Codes and Student Policies](#). To ensure fair and full achievement of degree requirements, students must prepare and present their own work. To show that they have completed their work with academic integrity, students should keep any drafts, notes, calculations, and the like.

## Course Policies

### Exams

Exam 1 and Exam 2 are not comprehensive, **the Final Exam is comprehensive.**

All exams will be in person, closed books and closed notes. Equation sheets will be allowed, the format of equation sheets will be given before each exam.

*Electronic devices, other than approved calculators, shall be out of sight and are not to be used during quizzes or exams. Violation of this policy will result in a 0 on the assignment and filing of an Academic Integrity Violation with the Dean of Students.*

No make-up exams except in the case of a documented emergency. If you know you have a conflict, please contact me at least a week in advance to arrange an alternative. If you do not have a documented emergency and/or you don't contact me at least a week in advance, you will receive a grade of 0 on the exam.

Several opportunities for extra credit will be provided throughout the semester. Therefore, final grades will **NOT** be curved. Engineering problem solving process and writing format is required for all the extra credit opportunities, or no credit will be given.

## Quizzes

Quizzes will be based on homework problems, given the day homework is due.

Lowest quiz score will be dropped.

## Assignments

Assignments will be posted on Canvas and are required to be submitted on Canvas. **Please combine your work to only one PDF file for each submission.** Late assignments will be penalized 10% per day. Assignments will not be accepted more than **5** days late.

Lowest assignment score will be dropped.

Assignment requirements:

Please provide the following information and clearly label it when completing homework and exam problems.

1. Schematic diagram of the problem.
2. Given/Known: State the given information of the problem.
3. Find: State the variables which need to be found.
4. Solution: (a) If necessary show control volume or schematic diagram of the problem, (b) write out complete equations which govern the problem, (c) solve the governing equations and show all work, and (d) put a box around your final answer and do not forget to include proper units.
5. Sanity Check: Make sure your answer makes sense and is reasonable. Please present your work in a professional manner. Sloppy or illegible work will receive a grade of 0.