

Heat and Mass Transfer

Spring 2021

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Office hours: Monday-Friday 10.00-18.00 (subject to availability), e-mail or phone.
TAs: TBD

Text: Introduction to Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt, Seventh Edition and lecture notes.

Prerequisites: Junior Standing (Basic Fluid Mechanics knowledge would be helpful, but students without any thermal-fluid knowledge could still do well in this course with some additional effort).

Grading: Midterm 1 20%, Midterm 2 20%, Final Exam 20%, Term Project 20%, Attendance 20% (based on exercises in recitations, hws and attendances in class)

Course Description:

Heat and Mass Transfer is a vital subject for mechanical, chemical, production, aeronautical and metallurgical engineering disciplines. As a result of its multidisciplinary nature, it has many engineering applications. This course will introduce to students basic understanding of heat and mass transfer processes and their application to engineering problems. The objectives of this course are:

- To give fundamentals of heat and mass transfer
- To give insight into the design of thermal-fluid systems
- To help students to understand the physics behind heat and mass transfer

The following topics will be covered: 1- Introduction to Heat Transfer, 2- Conduction, 3- Mass Transfer, 4- Forced Convection, 5- Free Convection, 6- Boiling and Condensation, 7- Heat Exchangers, 8- Radiation.

Reference Books:

- Heat and Mass Transfer: A Practical Approach, Yunus Çengel, 2006, ISBN-10: 007325035X
- A Heat Transfer Textbook, 3rd edition John H. Lienhard IV, Professor, University of Houston, John H. Lienhard V, Professor, Massachusetts Institute of Technology, <http://web.mit.edu/lienhard/www/ahtt.html>
- Fundamentals of Fluid Mechanics, Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, Fifth Edition, 2006, ISBN-10: 047185526X
- Basic Heat and Mass Transfer (2nd Edition), A.F. Mills, 1999, ISBN-10: 0130962473

Course Outline (Subject to change)

Week/ Dates	Subjects	Text Reference
1	Introduction	Ch. 1+ Lecture notes
2-4	Conduction	Chs. 2-5+Lecture notes
5-6	Mass Transfer	Ch. 14+Lecture notes
6	Midterm Exam 1	
7-8	External Flows	Chs. 6-7+Lecture notes
9-10	Internal Flows	Ch. 8+Lecture notes
11	Free Convection	Ch. 9+Lecture notes
12	Boiling and Condensation	Ch. 10+Lecture notes
12	Midterm Exam 2	
13	Heat Exchangers	Ch. 11+Lecture notes
14	Radiation	Chs. 12-13+Lecture notes
14	Final Exam	
14-15	Project presentations	