

**Heat Transfer
(ME 318)
Milwaukee School of Engineering
Winter 2017-18**

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Required textbook: <u>Introduction to Heat Transfer</u> , 6 th Edition by Bergman, Lavine, DeWitt, and Incropera, John Wiley & Sons, 2011. Text has an online learning center at: http://bcs.wiley.com/he-bcs/

Prerequisite: ME 317 Fluid Mechanics, ME 2101 or ME 311 (Thermodynamics I)

Course Description: This course covers the three fundamental mechanisms of heat transfer: conduction, convection, and radiation. The course includes steady state and transient conduction, free and forced convection, as well as heat exchanger design.

Student Learning Outcomes (from ME program outcomes)

The student will demonstrate:

- an ability to apply knowledge of math, engineering, and science.
- an ability to design a system, component or process.
- an ability to identify, formulate, and solve mechanical engineering problems.
- an ability to work professionally in both thermal and mechanical systems areas.

Course Learning Outcomes

Upon successful completion of this course, the student will:

- demonstrate the ability to model physical systems subject to heat transfer, using calculus and differential equations.
- demonstrate the ability to solve the related differential equations both analytically and numerically, and concretely relate the results to an observable heat transfer process.
- be able to apply models of conduction, convection and radiation heat transfer, and to solve practical engineering heat transfer problems.

Methods of Assessing Student Outcomes: Assignments, quizzes, in-class exam(MidQuarter), and a final exam

Letter Grades (This is a rough guideline. Grade determination will be discussed further in class. Generally the average grade for the class will be approximately a BC. If a curve is necessary to achieve that average grade, Dr. Damm will apply a curve.)

<u>Letter Grade</u>	<u>% Equivalent</u>
A	93-100
AB	87-93
B	80-87
BC	75-80
C	70-75
CD	65-70
D	60-65
F	0-60

Grade Calculation	
Quizzes (3) and assignments	40 %
In-class exam (week 6)	25 %
Final exam	35 %

In-Class Exams and Quizzes:

Exams and quizzes will be closed book/closed notes/closed laptop. You will be allowed one side of an 8.5"x11" sheet of paper for formulas and notes. Calculators are allowed.

A Note Regarding Homework and Exam Problems:

ALWAYS circle your answers and ALWAYS express them in the appropriate units! In general, be careful about units and always include them in the answer. Generous partial credit will be given whenever possible so attempt all problems.

Final Exam:

There is no common final exam for ME 318. The final exam will be comprehensive, made up by Dr. Damm. You will be allowed 2 sides of an 8.5"x11" sheet of paper for formulas and notes.

Attendance, Participation and Class Decorum:

Students are expected to attend lectures regularly and to participate fully in class discussions. Attendance in class is to your advantage. After the first week of class, I will not take attendance & you will not be penalized for missing class, but certain important material and examples given here will **not** be in the textbook. Your level of effort will be used to determine borderline grades. Attendance is a factor in gauging your level of effort. **I will not drop students from the class for not attending.** If you desire to drop the course, you must do so with the university registrar.

Regarding Collaboration and Academic Honesty:

You are expected to conform to the MSOE code for academic honesty. If a student is caught cheating on an exam or quiz, the student will receive an *F for the course*. (Students who are disciplined for cheating are not allowed to drop the course.) If a student cheats on a lab report, assignment, or project, the student will receive a zero on the assignment and may receive an *F for the course* because of the zero grade. Cheating students will be reported to the Department Head and the VP of Academics. If you cheat you risk *expulsion* from MSOE.

Examples of cheating:

- copying homework or lab reports
- copying from another student on an exam
- permitting another student to copy from you on an exam, homework assignment, or lab report
- copying homework or lab reports from previous terms
- copying homework from a solutions manual or from previously distributed solutions
- copying a homework solution from a student who is solving the problem for others in a group setting

Bottom line--Any time you represent the work of others as your own you are cheating.

Late Work, Missed Exams:

Homework is due at the beginning of class on the due date. Late homework will not be accepted for credit or graded. A student will receive a zero on exams and quizzes that are missed without a legitimate excuse (e.g. documented illness, family tragedy, etc.).

Tentative Schedule

Week 1	Course Overview, Review, Ch. 1: Introduction	
Week 2	Ch. 1: Introduction, Ch. 2: Heat Diffusion Equation 2.3, 2.4	
Week 3	Ch. 3 Steady State Conduction sec. 3.1, 3.3	
Week 4	Ch. 3 Ch. 3 SS Conductions sec 3.3, 3.4-3.6	Quiz 1 (200 pts)
Week 5	Ch. 5 Transient Heat Conduction sec. 5.1-5.2	
Week 6	Ch. 6 Convection 6.1, 6.2, 6.6, 6.9	MQ Exam
Week 7	Ch. 7 Forced Convection, External Flow 7.1-7.6	
Week 8	Ch. 8 Forced Convection, Internal Flow	Quiz 2 (100 pts)
Week 9	Ch. 9 Free Convection	
Week 10	Heat Exchangers (an application of previous topics)	Quiz 3 (100 pts)
	Review(Q&A) Session, Time and place TBA	
<i>Final Exam Date and Time to be determined</i>		

- I will post a comment/suggestion box outside my office. Please let me know what you think about the course. I would particularly like to know how you feel about the pace of the course (too fast, too slow, or about right).

Student Accessibility Services (SAS)

- For students with documented disabilities, chronic medication conditions and mental health concerns; MSOE provides services to make reasonable accommodations available. If you are a student who requires or anticipates the need for accommodations, please contact Student Accessibility Services Office at 414-277-7281, by email at moureau@msoe.edu, or in person at K250 to discuss appropriate accommodations and eligibility requirements.