Western New England University
Springfield, Massachusetts
College of Engineering
ME 417-Heat Transfer
Course Policies
Spring 2018

Lectures:	Room # S105 Monday, Wednesday, Friday 1:00-1:50
Instructor:	Mehdi Mortazavi, Assistant Professor office # S209 office: 413-782-1490 email: mehdi.mortazavi@wne.edu
Office Hours:	Monday 2:00-4:00 pm; Wednesday 2:00-4:00 pm; Friday 10:00-12:00 pm; Other hours by appointment
Prerequisites:	ME 303, ME 316

Course Description: This senior level course is offered to both mechanical engineering majors and non-majors and is designed to convey the basic principles of heat transfer by incorporating a broad range of engineering applications. Students will use conduction, convection, and radiation equations to determine heat transfer rates over and through plane, cylindrical, and spherical surfaces; determine the optimum thickness of insulation; analyze the effect of heat generation on temperature distribution and heat rate; determine the performance of extended surfaces; calculate the temperature distribution and evaluate the heat rate for two-dimensional steady-state conduction; determine the temperature and heat transfer rate for one-dimensional and multidimensional transient conduction; determine the heat transfer rate over a cylinder, sphere, non-circular cylinders and on a tube bank in the cross-flow of a gas; and perform engineering calculations that involve energy balance and appropriate convection correlations for internal flows and radiation exchange between surfaces. (3 credits)

Materials:
Required:
Incropera, Frank P. and Dewitt, David P., **Introduction to Heat Transfer 6th edition**, Wiley

Supplementary:
Scientific calculator, hand-held, self-powered

Learning Objectives and Outcomes:
To develop in the engineering students the ability to understand the three principle modes of heat transfer: Conduction, Convection and Radiation.
Also, the purpose of this course is to enable the student to have a clear understanding of the theory and application of Heat Transfer.
The student must be able to satisfactorily perform the following:
1) To solve problems of Steady and Transient Conduction (a).
2) To determine fin effectiveness and fin efficiency (a, e).
3) To derive and solve problems of systems with heat generation (a).
4) To apply Numerical and Graphical Methods to solve 2-D, steady state conduction problems (a ,e, k).

5) To determine the convection heat transfer coefficients for the external and internal flow problems (a).
6) To perform an experiment and to solve problems of combined conduction, forced/natural convection and radiation and to design cooling fins for a cylindrical wall (a, b, c, e, k).

Note: [ ] corresponds to ABET Criterion for Program Outcomes and Assessment.

Assessment: Students will be evaluated on their performance on in-class and homework assignments, quizzes, examinations, and projects.

Requirements:

A. Assignments and Examinations

The written work for the course will consist of daily homework assignments, in-class quizzes, in-class projects, examinations, and a two-hour comprehensive final examination. Homework assignments will consist of both a reading and writing component; the student is responsible for reading the material that will be discussed in the following class and for reviewing in detail, prior to the class session, the example problems illustrated in the text. Each student is responsible for his or her own work. The use of the students calculator for all quizzes and examinations is required. The Course Syllabus outlines the material that will be covered during each week.

B. Writing Component

All written work is to be of the highest quality. Each student is expected to demonstrate, in writing, an appropriate understanding of the concepts of thermodynamics in the assigned projects. All written reports will be evaluated on the basis of appropriate organization, proper communication, neatness, grammar, spelling, and punctuation.

C. Computer Usage

When appropriate, computer use is encouraged.

D. Attendance and Assignments Students are expected to:
1. Be punctual and attend all class sessions;
2. Complete all assigned homework which will be collected and graded;
3. Take all quizzes, in-class exams, and the scheduled final examination;
4. Satisfy the reading requirement for all assigned chapters; and,
5. Complete all assigned projects.

E. Policy:
1. Non-compliance of ANY item in Section D is grounds for course failure;
2. Missed lectures and quizzes will NOT be made up. A student missing an examination will be given the opportunity to make up the exam ONLY if he/she presents satisfactory evidence that his/her absence was unavoidable. It is the obligation of the student to notify the instructor prior to the exam, at which time, arrangements will be made for a make-up exam. Students will receive an exam grade of 0 for all unexcused absences;
3. Students are responsible for the material contained in the text as well as for all the material discussed in class;
4. Each homework problem is to be individually done in a neat, logical and orderly manner on letter size paper (11 inch x 8.5 inch). Follow the format outlined in ENGR 103.
   Step 1: Restate problem
   Step 2: List assumptions and make a sketch
   Step 3: Work problem sequentially and orderly
   Step 4: Box answers
   Step 5: THINK, Does the answer make sense?

Problems must be submitted on only **one side** of sheets (although multiple problems can be put on one sheet if done neatly and clearly). Put the homework sheet (homework statement posted on Kodiak) and staple your worked sheets into it. Write your name on the top right of all pages **including the cover page**. All sheets must be **stapled** together in the upper left corner.

- Homeworks are due at the **beginning of the class**. Homeworks submitted after that (still within the class) will be graded out of 80% of the full credit.
- Late homeworks that are submitted after the class are not accepted under any circumstances. If you have missed the deadline **for ANY reasons**, you need to submit the *extra activity assignment* which includes more number of questions and will be graded out of 60% credit of the original homework.

- Submit your homework on letter size papers (any pattern is acceptable). Homeworks done on pages torn from spiral notebooks or pad will be graded out of 60% of the full credit.
- Please stable all papers properly. Folding edge of sheets together or any other *masterpiece* is not accepted (they get 60% of the full credit).
- Write on one side of each sheet. However, you can solve multiple questions on the same sheet (questions solved on the back side of papers will get 60% of the full credit).
- Homeworks should be submitted in hard copy format. Homeworks sent by email are not accepted (under any circumstances).
- It is highly recommended (not mandated) that you solve homeworks (and exams) by pencils. We are engineers and it is likely to make mistakes as we start solving a problem.

5. Homework will generally be assigned each week and must be submitted at the beginning of the class period for which it is due. **Late homework will NOT be accepted.**

Methodology: Class lectures, discussion, problem solving, quizzes, project, and exams.

Grading:

Exams during semester (3 exams)	30%
Homeworks	25%
Project	10%
Final Exam	25%
Quizzes	10%
Final Grade	100%

Grading Policy
Numerical grades earned throughout the semester will be averaged in the proportions noted above and converted to a final letter grade based on the ranges shown below:

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	65-69
D	60-64
F	0-59

Significance of Numerical Results:
When solving an engineering problem, the accuracy of the solution cannot be greater than that of the data provided. Numerical answers to problems must always be given using the number of significant figures appropriate to the problems statement and data used.

Course Policies (continued)
Other:
- You are not permitted to borrow your friend's calculator during a quiz or exam.
- Questions are always welcomed.
- The instructor reserves the right to change both the course policy and syllabus as the need arises. Students will be notified of any such changes.

Integrity and Scholarship:
The policy on Integrity of Scholarship is stated on page 26 of the Western New England University 2012-2013 Catalogue (available at http://www1.wne.edu/catalogue/). "Honesty in all academic work is expected of every student. This means giving ones own answers in all class work (including reports), quizzes, and

examinations without help from any source not approved by the instructor. Written material is to be the students original composition. Appropriate credit must be given for outside sources from which ideas, language, or quotations are derived. Dishonesty is cause for failure and/or dismissal.

Absence Dictated by Religious Beliefs:
Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirement which he or she may have missed because of such absence on a particular day, provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. **It is the responsibility of the student to make arrangements prior to the date of absence for completing the missed work.**

Student Disability Services:
The Department of Mechanical Engineering complies with the Americans With Disabilities Act in making reasonable accommodations for qualified students with disabilities. To request academic accommodations, the SDS Office in Deliso G05 can be contacted for information.

Class Cancellation:
When classes are cancelled, work that was due on the cancelled date will be collected at the next class meeting; quizzes (if any) and examinations that were scheduled on that date will be administered during the next class meeting.

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Course Syllabus*
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Textbook Incropera, Frank P. and Dewitt, David P., **Introduction to Heat Transfer 6th Edition**

Week	Class Topic	Reading Assignments
1	Introduction	Ch. 1
2	Introduction & Introduction to Conduction	Ch. 1,2
3	Introduction to Conduction & 1D, Steady State Conduction	Ch. 2,3
4	1D, Steady State Conduction	Ch. 3
5	Review & **Exam 1** & 2D, Steady-State Conduction	Ch. 4
6	2D, steady-state conduction & Transient Conduction	Ch. 4,5
7	Transient Conduction & Review	Ch. 5,6
8	Introduction to Convection & Review & **Exam 2**	Ch. 6
9	External Flow	Ch. 7
10	Internal Flow	Ch. 8
11	Review & **Exam 3** & Free Convection	Ch. 9
12	Free Convection & Boiling and Condensation	Ch. 9,10
13	Boiling and Condensation & Heat Exchangers	Ch. 10,11
14	Radiation: Processes and Properties	Ch. 12
15	Review	Ch. 1-12

*Note: This is not a firm list. There may be addition and/or deletions and/or any other modifications during the semester.

The subsections that will be covered are:

Chapter	Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6	Ch. 7	Ch. 8	Ch. 9	Ch. 10	Ch. 11	Ch. 12
	1.1	2.1	3.1	4.1	5.1	6.1	7.1	8.1	9.1	10.1	11.1	12.1
	1.2	2.2.2	3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2
	1.3.1	2.3	3.3	4.3	5.3	6.3	7.3	8.3	9.3	10.3	11.3	12.3
	1.4	2.4	3.4	4.4	5.4	6.4	7.4	8.4	9.4	10.4		12.4
Subsections	1.5	2.5	3.5	4.5	5.5	7.5		8.5	9.5	10.5		12.5
	1.6		3.6		5.5	7.6		8.6	9.6	10.6		12.6
	1.7				5.6	7.7		8.7		10.7		
					5.7			8.8		10.8		
					5.8							