CANKAYA UNIVERSITY
FACULTY OF ENGINEERING
MECHANICAL ENGINEERING DEPARTMENT

ME 313 HEAT TRANSFER

COURSE POLICY AND LEARNING OBJECTIVES
Fall 2018

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A-COURSE LEARNING OBJECTIVES:

1. Students understand and are able to use the conduction, convection and radiation rate equations
2. Students are able to use the conservation of energy to solve problems
3. Students are able to solve one-dimensional heat conduction problems using the energy equation and Fourier's law
    - 3.1. Students are well versed in the use of the thermal resistance network
    - 3.2. Students can solve one-dimensional problems in radial systems
    - 3.3. Students can solve problem involving some form of energy generation
    - 3.4. Students are able to solve problems involving extended surfaces
4. Students have an understanding of the analytical and numerical techniques used for solving two dimensional, steady-state and transient heat conduction
5. Students are able to solve simple transient heat conduction problems
    - 5.1. Students are able to use the lumped capacitance method
    - 5.2. Students are able to solve problems where spatial effects are important using approximate methods and the Heisler charts
    - 5.3. Students are able to solve problems with a semi-infinite dimension
    - 5.4. Students are able to solve simple transient problems with multidimensional effects
6. Students are able to solve problems where convection heat transfer is important
    - 6.1. Students understand the origin and implications of boundary layers for laminar & turbulent flows, and their impact on convection heat transfer
    - 6.2. Students are aware of the similarity solutions
    - 6.3. Students understand the origin of relevant dimensionless parameters
    - 6.4. Students understand the implications of Reynolds' analogy
    - 6.5. Students understand the hydrodynamic and thermal considerations for internal flows

6.6. Students understand the derivation of the energy balance for constant temperature & constant heat flux boundary conditions for internal convection problems

6.7. Students are able to use convection correlations to solve forced convection problems for external and internal flows

6.8. Students understand the important physical aspects of free convection

6.9. Students have knowledge of the governing equation relevant to natural convection

6.10. Students understand the relevant dimensionless numbers for natural convection

6.11. Students are able to use Nusselt number empirical correlations to solve natural convection problems

7. Students are able to solve simple radiation problems

7.1. Students understand concepts such as blackbody, surface emission, absorption, radiosity

8. Students are able to find appropriate view factors, and compute simple radiation exchanges for gray surfaces.

B-TEXT BOOK:

1) Foundatıons of Heat Transfer, 6 th Ed., F.P. Incropera and D.P. DeWitt,T.L Bergman and A.S.Lavıne JohnWiley and Sons, New York, 2013.
   or
2) Principles of Heat and Mass Transfer,Global Edition, F.P. Incropera and D.P. DeWitt, T.L Bergman and A.S.Lavıne JohnWiley and Sons, New York, 2017.

C-PREREQUISITE:

The material in ME 313 Heat Transfer is based on the understanding of: (1) Calculus, including ordinary differentiation, integration, and partial differentiation; (2) Thermodynamics; (3) Differential equations; (4) Linear algebra

D-ASSIGNMENTS:

In addition to this course policy statement, please find the course syllabus. The course syllabus provides a detailed listing of the topics to be covered in each lecture As basic preparation for each lecture, you should read the assigned section of the textbook before coming to class. The problems assigned from the textbook are illustrative of the general material and problems found on exams. You should attempt to solve the assigned homework problems before each lecture period. This will help you to formulate questions about the material to be discussed in lecture and help you understand the lecture discussions.

There are homework problems assigned for you to work outside of lecture.; a file of solutions for assignments up to the current one will be kept in ME 313 web page.

In addition to the weekly reading and homework problem assignment assignments, it is suggested that you review your class notes on a daily basis. You are responsible for all

material listed in the syllabus and discussed in lecture. Finally, your instructor may not cover every single topic on the course syllabus in the order that it is listed, or may not have time in lecture to cover all the material listed in the syllabus. You are responsible for all the material listed in the syllabus.

E-EXAMINATIONS:
See grading policy.

F-PREPARATION FOR EXAMINATION:
In order to be properly prepared for examination, you should: (1) Attend and participate in all lectures; (2) Read the textbook and your class notes on a regular (every day); and (3) complete and study the homework assignments. If you neglect any aspect of this trilogy, you will almost guarantee yourself a poor performance. In order to perform well on exams, you must not only know how to solve problems in heat transfer, but you must be comfortable with the basic concepts of the material. This is because the exams are developed in order to test your understanding of heat transfer through problem solving, short answer, conceptual, and other types of questions.

On the exams, points will be deducted if you do not start with a basic equation, if you do not clearly indicate your assumptions, if you do not provide sufficient detail during your analysis, if you do not carry units through during your analyses.

G-HELP:
Help is available outside of the lecture period .You may visit me in my office.

When you bring a question to me, I will ask to see what you have accomplished and where you got stuck. If you have not started yet, you will only receive a suggestion as to where to start. The office hours is not available to provide easy answers that will boost your exam score. It only exists to assist you in the process of learning heat transfer.

H-COURSE GRADING:
The course grade will be based on the score obtained from the following the distributions:

Attendance	5%
Two midterms	30%
Quizzes	25%
Final exam	40%

It is expected that you attend your registered lecture on a regular basis. If you have to miss class on occasion, i.e. you overslept, were snowed in, or had a medical problem, etc., and then you should try and get the class notes from one of your colleagues.

I-CLASSROOM RULES:
Common courtesy while in the classroom is a pre-requisite for learning. The following is expected of students in ME 313.

- Turn off all cell phones, pagers, beepers, etc. before entering classroom. It distracts and annoys those sitting near you when your phone, beeper or pager goes off during lecture.
- Do not read the newspaper once lecture has started. Those behind you cannot see the board/overhead screen through the paper. It is also insulting to your instructor.
- Remove the newspaper, soda cans, candy wrappers and anything else you bring into classroom when you leave. There are trashcans outside for any refuse. Smoking will not be permitted.
- Class time is not for a socializing. Please restrict your conversations to subjects related to ME 313. It is distracting and annoying to those sitting near you if you're talking about non-class issues while lecture and discussion is going on. Plus, you'll invariable miss important information. Finally, it's disrespectful of your instructor.

J-SOME ADVICE:
Reading your textbook and class notes, and working the homework problems on a daily basis is the best way to ensure you learn the material and are prepared for exams. Hard work and struggle is generally required, especially in the early stages of the class, so try and get into the swing of things as soon as possible.

Good luck!

Prof.Dr.Nevzat Onur