ENME321 -- Transfer Processes Summer 2017

Mechanical Engineering Department University of Maryland Baltimore County

Academic Integrity

"By enrolling in this course, each student assumes full responsibility of as a participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty. Academic misconduct could result in disciplinary action that may include, but is not limited to a grade of zero on the particular work, a grade of F in the class, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.

http://www.umbc.edu/provost/AcademicIntegrity/Honorcode.htm

For this course, in particular, we require that each student finishes his/her homework individually. Students are allowed to discuss their homework with other students, however, copying the homework from each other or from the homework solutions is not allowed.

Instructor: Dr. Liang Zhu Office: 220 Engineering
Phone: 410-455-3332 Office hours: 3 pm - 5 pm Tu Thurs
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Teaching assistant: TAB; Email: TAB; Office hours: TAB

Text book: Fundamentals of Heat and Mass Transfer, by Frank P. Incropera and David P. DeWitt, *7th Edition*, John Wiley & Sons, NY 2007. Older or newer edition of the book is fine.

Prerequisites ENME320, or equivalent. There is the course prerequisite. In order to do well in ENME321, you should have a good understanding of the following

-integration -boundary layers
-ordinary differential equations -the 1st law of thermodynamics

Purpose of course To introduce the use of the applicable physical principles and rate equations in the determination of the energy transfer rates.

Important tool for communication between instructor and students:

Blackboard Learning System™. All course documents will be placed in the Blackboard under the folder ENME321. Announcements will be given regularly.

Preparation for class: The student is expected to read assigned pages from the text book and other assignments prior to class lecture. Assigned homework problems will be collected on due dates; no late homework will be accepted for any reason.

Topics to be covered

Introduction:

Fourier's Law, Newton's Law of Cooling, Stefan-Boltzmann Law

Heat conduction

Energy equation
Steady state solutions (1-D, composite solids, extended surfaces, 2-D,)
Transient solutions (1-D, finite differences)

Radiation

Black body radiation
Radiant emission and properties of real materials surfaces
Radiant exchange between surfaces (Black and gray)

Convection

Review of boundary layer theory
Forced convection (External, internal)
Natural (Buoyancy Induced) convection

Heat exchangers

Grading

Homework Assignments	50%
Final exam	50%

- The final grade reflects performance set against certain standards, not assigned according to a distribution rule. The passing grade (C) is 60.

Tentative Schedule

	Tuesday	Thursday
Week 1	1.1-1.3, 2.1-2.4, 3.1-3.2	3.3-3.5
Week 2	3.6, 4.1-4.5	5.1-5.3, 5.4-5.6
Week 3	12.1-12.2	12.3-12.4
Week 4	13.1-13.3,	6.1-6.2, 7.1-7.3
Week 5	7.4-7.5, 8.1-8.6	9.1-9.3, 9.4-9.8,
Week 6	11.1-11.3, 11.4-11.6,	Final (TBA)