

## ENME321 -- Transfer Processes Summer 2012

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 and project individually. Students are allowed to discuss their homework and project with other students, however, copying the homework from each other or from the homework solutions is not allowed. Since the project topics don’t change significantly from semester to semester, it is not allowed for any student to discuss the project with students who took this course previously or to look at the graded project reports from previous semesters.**

**Instructor:** Dr. Liang Zhu  
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Office: 220 Engineering  
Office hours: 3 pm - 5 pm Tu Thurs

Teaching assistant: TAB; Email: TAB; Office hours: TAB

**Text book:** Fundamentals of Heat and Mass Transfer, by Frank P. Incropera and David P. DeWitt, 6th Edition, John Wiley & Sons, NY 2007

**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

<b>Grading</b>	Homework Assignments	15%
	2 exams (25% each)	50%
	Final exam	35%

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