

King Fahd University of Petroleum & Minerals  
MECHANICAL ENGINEERING DEPARTMENT

**ME 440 : Convective Heat and Mass Transfer**  
*Spring Semester 2003-2004 (032)*

**Instructor:** Dr. S. Z. Shuja **Office:** 22-120; **Phone:** 4465

**Textbook:** Incropera, F. P. and DeWitt, D. P. **Fundamentals of HEAT AND MASS TRANSFER.** John Wiley Publisher, 5<sup>th</sup> Edition 2002.

- References:**
- 1) Mills, A. F. **Basic Heat and Mass Transfer.** Prentice Hall Publisher.
  - 2) Kays, W. M. and Crawford, N. E. **Convective Heat and Mass Transfer** McGraw Hill Book Company.
  - 3) Thomas, L. C.. **Heat Transfer- Professional Version,** Capstone Publisher.

**Course Description:** Boundary layers; laminar boundary layer heat transfer; turbulent boundary layer heat transfer; free convection boundary layers; enclosures; convection mass transfer; boiling and condensation; pool boiling; two phase flow; laminar and turbulent film condensation.

**Prerequisites:** ME 315.

**Goals:** Understand the basic concepts of convective heat and mass transfer and their applications in industry. Develop the ability to analyze problems dealing with performance evaluation and design of heat and mass transfer equipment(s). Develop the ability to solve problems based on theoretical concepts, such as the laminar and turbulent boundary layers.

**Material to be covered:**

Classes (50 minutes)	Topics
6	Introduction to convection.
6	External Flow.
6	Internal Flow.
8	Free Convection.
9	Boiling and Condensation.
8	Diffusion Mass Transfer

**Attendance:** Attendance will be strictly observed and each absence will result in a deduction of 0.5 point of the final grade.

**Evaluation:**

Exam 1	<b>Mar. 21, 2004 6-7:30pm</b>	15%
Exam 2	<b>May. 4, 2004 6:30-9 pm</b>	25%
Quizzes		15%
Homework		10%
Final Exam (Comprehensive)		35%

**Homework:** Homeworks will be assigned regularly and will be due a week later. Late homework will not be accepted.