

MSE 3210 Transport Phenomena (required)

Catalog Description: (3-0-3)

Prerequisites: MATH 2401 or MATH 2411 and MATH 2403 or MATH 2413

Prerequisites with concurrency: MSE 3001

Textbook: Theodore Bergman, Adrienne Lavine, Frank Incropera and David DeWitt
Fundamentals of Heat and Mass Transfer, Seventh edition, John Wiley & Sons, 2011

Prepared by: Wallace Carr

Topics Covered:

1. Basic Principles of Heat Transfer
2. Steady State Conduction
3. Transient Conduction
4. Convection
5. Heat Exchangers
6. Basic Principles of Diffusion Mass Transfer
7. Steady State Mass Transfer
8. Transient Mass Transfer

Course Outcomes:

Outcome 1: The student will demonstrate an understanding of the basic heat transfer mechanisms through solving practical heat transfer problems.

Outcome 2: The student will demonstrate an ability to solve transient heat transfer problems with convective boundary conditions using lumped capacitance, analytical and exact solution, and semi-infinite solid methods.

Outcome 3: The student will demonstrate an ability to determine heat and mass transfer convective heat transfer coefficients and solve basic convection heat and mass transfer problems.

Outcome 4: The student will demonstrate an understanding of basic diffusional mass transfer through solving practical basic mass transfer problems.

Outcome 5: The student will demonstrate an ability to solve transient mass transfer problems with convective boundary conditions using lumped capacitance, analytical and exact solution, and semi-infinite solid methods.

Correlation between Course Outcomes and Student Outcomes:

Course Outcomes	Student Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
Course Outcome 1	x										
Course Outcome 2	x										
Course Outcome 3	x										
Course Outcome 4	x										
Course Outcome 5	x										
Entire Course	3	0	0	0	0	0	0	0	0	0	0
0 = None or insignificant; 1 = Some; 2 = Moderate; 3 = Strong											

School of Materials Science and Engineering Student Outcomes:

- (a) an ability to apply knowledge of mathematics, science and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice