

CME 322 Heat and Mass Transfer (Required)

Course Instructor: *Dr. Tadanori Koga*

Website: none

Course Goals:

Heat transfer by conduction, principles of heat flow in fluids with and without phase change, heat transfer by radiation, heat-exchange equipment. Principles and theory of diffusion, mass transfer between phases, distillation, leaching and extraction, fixed-bed and membrane separation, crystallization. [3 credits]

Pre- or Corequisite(s): CME 318; CME 304; minimum of B- in CME 304

Text(s): *W.L. McCabe, J.C. Smith, P. Harriott, Unit Operations of Chemical Engineering, 6th ed., McGraw Hill, 2001*

Class/ Laboratory Schedule:

Spring: Lecture, Monday/Wednesday, 8:05-9:25 am

Topics Covered:

Week 1: Introduction and overview of concepts of heat and mass transfer

Week 2: Principles of conduction and convection

Week 3: Heat Transfer in fluids with and without phase change

Week 4: Radiative heat transfer

Week 5: Boiling, evaporation and condensation

Week 6: Design of heat exchangers

Week 7: Review and Mid-term

Week 8: Principles of diffusion and mass transfer between phases

Week 9: Gas absorption and humidification operations

Week 10: Equilibrium – Stage Operations

Week 11: Distillation phenomenon and introduction to multi-component distillation

Week 12: Leaching and Extraction

Week 13: Drying of solids and fixed-bed separations

Week 14: membrane separation and crystallization

Week 15: Review, Design project due, and final exam

Contribution of course to meet professional component:

Relationship of course to program outcomes:

CTPC "3a-k" Outcomes	% contribution
A. Ability to apply knowledge of math, engineering, and science	20%
B. Ability to design and conduct experiments, analyze data	20%
C. Ability to design system, component or process to meet needs	22%
D. Ability to function on multi-disciplinary teams	
E. Ability to identify, formulate, and solve engineering problems	23%
F. Understanding of professional and ethical responsibility	5%
G. Ability to communicate effectively	2%
H. Broad education	2%
I. Recognition of need and ability to engage in life-long learning	2%
J. Knowledge of contemporary issues	2%
K. Ability to use techniques, skills, and tools in engineering practice	2%
Any other outcomes and assessments?	
	100%

Prepared by _____

Date Prepared: _____