

CME 440 Process Engineering and Design I (Required)

Course Instructor: *Dr. Devinder Mahajan*

Website: none

Course Goals:

Classical methods of chemical process engineering, advanced mathematical techniques and computer software for efficient and accurate process design and development. Mini-project design will lead to design project to be undertaken in CME 441. [3 credits]

Pre- or Corequisite(s): U3 or U4 standing in CME, CME 320, CME 327

Text(s): Seider, W.D., Seader, J.D., and Lewin, D.R., Process Design Principles: synthesis, Analysis, and Evaluation, John Wiley & Sons, 1999

Class/ Laboratory Schedule:

Fall, Lecture Monday, Wednesday, 5:20-6:40 pm

Topics Covered:

Week 1: Introduction to process design

Week 2: Process synthesis; reaction synthesis; reactor synthesis; separation systems synthesis

Week 3: Flow sheet preparation; degrees of freedom; information flow

Week 4: Computer-aided process design

Week 5: Review of volumetric properties of real gases and liquids Quiz 1

Week 6: Review of phase equilibria, applied thermodynamics of multi-component non-ideal systems

Week 7: Design of multi-component distillation; shortcut methods; gas absorption; extraction

Week 8: Review Mid-term

Week 9: Reactor Design and selection for chemical reactions

Week 10: Heat exchangers: design and workings

Week 11: Design of process piping; pumps, compressors Quiz 2

Week 12: Design project: discussion

Week 13: Preliminary presentation: Design project

Week 14: Design project report due

Week 15: Review 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	15%
B. Ability to design and conduct experiments, analyze data	
C. Ability to design system, component or process to meet needs	27%
D. Ability to function on multi-disciplinary teams	20%
E. Ability to identify, formulate, and solve engineering problems	10%
F. Understanding of professional and ethical responsibility	10%
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	10%
Any other outcomes and assessments?	
	100%

Prepared by _____

Date Prepared: _____