

## **CME 441 Process Engineering and Design II (Required)**

**Course Instructor:** *Dr. Devinder Mahajan*

**Website:** none

### **Course Goals:**

Major Design Project: review engineering design principles; engineering economics, economic evaluation, capital cost estimation; process optimization; profitability analysis for efficient and accurate process design. [3 credits]

**Pre- or Corequisite(s):** U3 or U4 standing in CME, CME 401, CME 440

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

Baasel, D.W., *Preliminary Chemical Engineering Plant Design*, Elsevier Science Publishers, 1978

### **Class/ Laboratory Schedule:**

Spring, Lecture Tuesday, Thursday 2:20-3:40 pm

### **Topics Covered:**

Week 1: Review fundamentals of process design

Week 2: Process design elements: nature of the process; reactors and other unit operations

Week 3: materials and energy balance

Week 4: Integration of process design elements

Week 5: Process design: computer-aided design software usage

Week 6: Flow sheet preparation and review

Week 7: Engineering economics

Week 8: Project review and discussions – Preliminary project report due; Presentation: status of project design

Week 9: Capital cost estimation

Week 10: Process economics evaluation

Week 11: Profitability analysis

Week 12: Design project: discussion

Week 13: Preliminary presentation: Design project

Week 14: Process optimization

Week 15: Design project report due, Final presentation

**Contribution of course to meet professional component:**

**Relationship of course to program outcomes:**

<b>CTPC "3a-k" Outcomes</b>	<b>% contribution</b>
A. Ability to apply knowledge of math, engineering, and science	18%
B. Ability to design and conduct experiments, analyze data	
C. Ability to design system, component or process to meet needs	36%
D. Ability to function on multi-disciplinary teams	10%
E. Ability to identify, formulate, and solve engineering problems	10%
F. Understanding of professional and ethical responsibility	10%
G. Ability to communicate effectively	
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:** \_\_\_\_\_