

# Green Engineering Principles for Chemical Processes

CHEE 4/6/8010

TTh 4:10-5:25 pm, PL 1030

## Catalog Description

The principles of chemical process analysis and design are introduced for the development of green engineering processes. Common components of chemical processes are reviewed and quantitative analyses of process performance and economics developed. The impact of design variables on materials and energy usage is demonstrated.

## Student Learning Outcomes

1. Identify different types and the components of chemical process diagrams
2. Perform mass and energy balances for chemical processes
3. Identify different types of fluid flow, heat transfer, separation, and reactor equipment and determine required size
4. Determine process economic analysis and profitability

## Textbook

R.M. Murphy, Introduction to Chemical Processes, McGraw-Hill, New York, 2007.

## Instructor

Dong-Shik Kim, Professor of Chemical & Environmental Engineering, 3051 Nitschke, (419) 530-8084, Email: [dong.kim@utoledo.edu](mailto:dong.kim@utoledo.edu)

## Office Hours

Mon & Wed 2 – 4 pm. I often will be available on-line.

## Grading

Letter grades will be assigned based on the percentage of points accumulated using the scale: A, 100-90; B, 89-80; C, 79-70; D, 69-60; F, 59-. The point total will consist of a sum of the following items:

Assessment	4010	6010	8010
Homework	40%	30%	30%
First Exam	20%	20%	15%
Second Exam	20%	20%	15%
Final Exam	20%	20%	20%
Research Paper		10%	
Design Project			20%

## Class Plan Overview

Week	Topics	Reading
8-24	Converting the Earth's Resources into Useful Products	1
8-31		
9-7	Process Flows: Variables, Diagrams, Balances	2
9-14		
9-21	Mathematical Analysis of Material Balance Equations	3
9-28		
10-5	EXAM 1, 10/8 (No class 10/6. Fall Break)	
10-12	Synthesis of Reactor Flow Sheets	4
10-19		
10-26	Selection of Separation Technologies	5
11-2		
11-9	EXAM 2, 11/12	
11-16	Process Energy Calculations	6
11-23	NO CLASS (Thanksgiving)	
11-30	Process Energy Calculations	6
12-7	Oral Presentations	
12-14	<b>FINAL EXAM</b>	

## **Academic Policies**

Students are responsible for following all academic policies of the University. The student handbook is available at:

<http://www.utoledo.edu/studentaffairs/index.html>

Academic Policies can be read in their entirety on the Academic Policy Webpage at:

<http://www.utoledo.edu/policies/academic/undergraduate/index.html>

**Academic Dishonesty:** Academic dishonesty will not be tolerated. Among the aims of education are the acquisition of knowledge and development of the skills necessary for success in any profession. Activities inconsistent with these aims will not be permitted. Students are responsible for knowing what constitutes academic dishonesty. If students are uncertain about what constitutes plagiarism or cheating they should seek the instructor's advice. For examples of Academic dishonesty please visit the policy webpage.

**Adding a Course:** A student may add a course within the first five calendar days of fall or spring term with no signature required as long as a seat is available. Student wishing to add a class between the sixth calendar day and the 15th calendar day inclusively of a new term may be able to do so with approval and signature of the course instructor. A late registration fee is assessed for initial registrations on or after the first day of the semester. The *form* to add a class is available on the registrar's web site. For more information visit the policy webpage

**Dropping a Course:** An undergraduate student has the right to make changes to their schedule of classes prior to the end of business on the fifteenth calendar day of the term. Summer sessions within the summer term are prorated.

**Missed Class Policy:** Students are expected to attend every class meeting of courses in which they are registered. Only in specific, unavoidable situations does the university excuse absences from class (see policy for specific on excused absences).

**Cheating/Plagiarism:** All students are expected to adhere to the academic integrity policy found in the UT Student Handbook. Students found cheating or plagiarizing will be referred for appropriate disciplinary action.

**Academic Accommodations:** Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss. Students with documented disabilities need to contact the Office of Accessibility at 419.530.4981 in RH 1820 to coordinate reasonable academic accommodations in accordance with ADA and Section 504 of the Rehabilitation Act of 1973.