

CHEN 4815 - Unit Operations 2

Fall 2026 Syllabus, Section 01, CRN 40741,

Credit hours: 3

Instructor

Byung-Wook Park

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Public Instructor Information

Instructor Title:

Associate Professor

Instructor Professional Qualifications:

Ph.D., Chemical Engineering, The University of Toledo, 2012

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Course Description

4815. Unit Operations 2. Gas absorption and desorption, interphase mass transfer processes, liquid extraction and leaching. Physical separation processes including filtration, settling, and size reduction. Derivation of the design equations for the above processes, and applications of the design equations to equipment design. Prereq.: C or better in CHEN 3787. Coreq.: CHEN 4815R. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Separation Process Principles	J.D. Seader, E.J. Henley	0-471-46480-5
Optional	Transport Processes and Separation Process Principles	C.J. Geankoplis	0-13-101367-X
Optional	Equilibrium Staged Separations	P.C. Wankat	0-13-500968-5
Optional	Unit Operation of Chemical Engineering	W.L. McCabe	0-07-039366-4

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Week of	Proposed Topic	Due/To Prepare for Class
8/24	Types of Separation Processes, Molecular Diffusion, Examples	
8/31	Diffusivities and Diffusivities, Examples Mass Transfer, Binary Vapor-Liquid Systems	
9/7	Multicomponent Vapor-Liquid Cascades, Distillation Terms, Distillation – McCabe-Thiele – Rectifying	
9/14	Distillation – McCabe-Thiele – Stripping Distillation – McCabe-Thiele Example Distillation – Example continued	
9/21	Distillation – Efficiency, Diameter Distillation – Diameter, Height Distillation – Tray Parameters	
9/28	Distillation – Tray Parameters Example	

10/5	Distillation – Multicomponent Gas-Liquid System, Absorption Equipment, Terminology	Test 1
10/12	Absorption – Operating Lines Absorption – Operating Lines Example Absorption – Algebraic Stages	
10/19	Absorption – Similarity to Distillation Absorption – Example Absorption – Example, High Capacity	
10/26	Absorption – Packed Columns Example Absorption – Packed Columns Pressure Sizing Absorption – Packed Columns Pressure Example	
11/2	Ternary Liquid-Liquid Systems, Terminology LLE – Operating Lines and Stage Determination	Test 2
11/9	LLE – Operating Lines and Stage Determination LLE – Operating Lines and Stage Determination	
11/16	Compressibility, Phase Diagrams LLE – Equipment LLE – Scale-Up, Flow, and Solvents	
11/23	LLE – Droplet, Mass Transfer Coefficients No class – Thanksgiving Day No class – Thanksgiving Day	
11/30	LLE – Finish Material LLE – Finish Material	Test 3
12/7		Final Exam

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.