Jordan University of Science and Technology

Faculty of Engineering

Chemical Engineering Department

CHE463 Separation Processes - JNQF Level: 7

First Semester 2023-2024

Course Catalog
3 Credit Hours. Applying mass transfer principles, chemical engineering thermodynamics basics and mass and energy balances to design binary and multi-component, single-stage and multi-stage, batch and continuous, physical separation processes. The covered separation processes are distillation, extraction, leaching and drying.

Text Book	
Title	Transport Processes and Unit Operations
Author(s)	Christie Geankoplis A Allen Hersel Daniel H. Lepek
Edition	5th Edition
Short Name	Textbook
Other Information	Prentice Hall, 2018

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref # 1	Separation Process Principles	J.D. Seader, E.J. Henley, D.K. Roper	4th Edition	John Wiley & Sons, 2015.
Ref # 2	Separation Process Engineering: Includes Mass Transfer Analysis	Wankat, P.C.	5th Edition	2022 Prentice Hall PTR. h
Ref # 3	Coulson & Richardson's chemical engineering	Harker, J.H., J.F. Richardson, and J.R. Backhurst	3rd Edition	

Instructor	
Name	**Prof. Mohammed Al-Saleh**
Office Location	CH2L2-3

Office Hours	Sun : 09:30 - 10:30 Sun : 11:30 - 12:30 Mon : 08:30 - 10:30 Tue : 09:30 - 10:30 Thu : 08:30 - 10:30
Email	mhsaleh@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 10:30 - 11:30 Room: CH2111

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
223640	CHE364 Mass Transfer	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction to Separation Processes	From **Textbook**
Weeks 2, 3, 4, 5	Binary Distillation (V-L separation)	From **Textbook**
Weeks 6, 7, 8	Multi-component distillation	From **Textbook**
Weeks 8, 9, 10	Extraction (L-L separation)	From **Textbook**
Week 11	Leaching (L-S separation)	From **Textbook**
Weeks 12, 13, 14, 15	Drying	From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Apply fundamental knowledge to derive VLE equilibrium data [7SO1] [1L7K1]	7%	1st, HW
Ability to design flash, batch, and steam distillation units [7SO2] [1L7S1]	7%	1st, HW
Ability to use McCabe-Thiele method to calculate number of stages in distillation [17SO2] [1L7S2]	17%	1st, HW, Final
Ability to perform multi-component flash calculations, including bubble and dew point calculations [11SO2] [1L7S1]	11%	2nd, Project, HW
Ability to use shortcut methods to calculate the number of stages, minimum reflux ratio and feed stage location in multicomponent distillation [11SO2] [1L7S2]	11%	2nd, Project, HW
Ability to calculate minimum solvent flowrate and number of stages in counter-current extraction process [17SO2] [1L7S2]	17%	2nd, HW, Final

Ability to design packed bed extraction column [5SO2] [1L7S2]	5%	Final
Ability to perform calculations on a single and multi-stage leaching process [5SO1] [1L7S2]	5%	Final
Ability to create drying curves and estimate the time required for drying [20SO1] [1L7S2]	20%	Final

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
32	68					

Relationship to NQF Outcomes (Out of 100%)		
L7K1	L7S1	L7S2
7	18	75

Evaluation	
Assessment Tool	**Weight**
1st	20%
2nd	20%
Project	10%
HW	10%
Final	40%

Policy	
Attendance	Attendance will be checked at the beginning of each class. University regulations will be strictly followed for students exceeding the maximum number of absences.
Homework	Homework problems are assigned during lecture and usually due one week later. Late homework will not be accepted. Try to solve the problems independently. The assigned problems will be collected, graded, and returned to you in lecture. Late homework will not be accepted
Quizzes	Quizzes will be part of this course. No make-up quizzes will be conducted except in the case of a documented emergency
Student Conduct	It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Cheating will not be tolerated in this course. University regulations will be pursued and enforced on any cheating student. Mobile phones are not allowed to be seeing on desk during the exams.

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