Syllabus

Code/Name	GBM 304 / SEPARATION AND PURIFICATION PROCESSES
Type	Required
Credit/ECTS	2/2
Hour per Week	2 (3+0+0)
Level/Year	Undergraduate/3
Semester	Spring
Classroom	D
Content	Evaporation and Evaporator Design/ Batch Distillation, Continuous Distillation/ Distillation in Two-Component Systems/ Distillation in Multi-Component Systems/ Extractive Distillation, Azeotropic Distillation/ Liquid-Liquid Extraction and Solid-Liquid Extraction.
Prerequisites	-
Textbooks	***Primary*** Doran, P. M., Bioprocess Engineering Principles, Elsevier Science & Technology Books,1995, Clarke,K.G., Bioprocess Engineering An Introductory Engineering and Life Science Approach, 1st ed. 2013, Woodhead Publishing Limited, Najafpour, G., Biochemical Engineering and Biotechnology, 1st ed. Elsevier Science 2006 ***Secondary*** Recent articles, Scientific videos
Objectives	• To recognize the importance of separation processes, which are mass transfer applications, through evaporator, distillation and extraction operations and design. • To interpret the importance of equilibrium-state processes, process steps and mass transfer processes in chemical engineering. • To formulate graphical calculation techniques based on the use of McCabe-Thiele diagram, Ponchon-Savarit diagram and triangle diagrams for binary systems.
Course Outcomes	In this course you will be able to: CO1 Recognize the importance of separation processes in chemical engineering. CO2 Examine different separation processes such as evaporation, distillation, liquid-liquid extraction and solid-liquid extraction. CO3 Formulate McCabe-Thiele diagram, Ponchon-Savarit diagram and triangular diagram, which are graphical calculation methods for binary systems. CO4 Set up mass and energy balances during evaporation, distillation and extraction design. C05 Gaining the ability to select data and information on current separation and purification processes

Weekly Schedule of Topics

W	Topic
1	Downstream processing bioproducts, needs and approaches
2	Cell disruption
3	Filtration
4	Centrifugation
5	Precipitation
6	Adsorption

7	Extraction
8	Chromatography I
9	Chromatography II
10	Drying Evaporation
11	Lyophilization
12	Crystallization
13	Novel Approaches
14	Novel Approaches

Professional Contribution	

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	0	5	4	0	5	0	0	0	0	0	3
CO2	0	4	0	3	3	4	0	0	0	0	3
CO3	0	0	5	0	0	5	0	0	0	0	3
C04	0	5	4	5	3	0	0	0	0	0	3
C05	0	5	4	5	3	0	0	0	0	0	5

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	Students work in groups for the assignments.
Requirements	n/a
Course Policy	• Be in the class on time. • English should always be used to communicate with one another. • At least 80% attendance is required, otherwise, a grade of **DZ** will be assigned. • You must be present in class for the presentations, otherwise you will not be graded.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures, and tables from web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Assignment 20% Midterm 30% Final Exam 50% Total 100%
Rubic	**n/a**

Instructor

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Room	321	Office Hours	Tuesday 13:30-15:30 Wednesday 13:30-15:30

Prepared by Özge Güzel in November, 2024.