



UNIVERSITI TEKNOLOGI MARA

CMT463: UNIT OPERATION

Course Name (English)	UNIT OPERATION APPROVED
Course Code	CMT463
MQF Credit	3
Course Description	This course is aimed at providing students comprehensive knowledge on the on the concepts of material balance and performance of equipment for solvent extraction, gas absorption and distillation. Others physical separation processes include size reduction; agitation and mixing are also covered.
Transferable Skills	Define and identify concept of physical and mechanical separation processes. Discuss the theory, definition and applications of physical and mechanical separation processes. Calculate and solve problems involving mass balance on physical separation processes. Perform laboratory experiments on separation processes, interpret the experimental data and report on the experimental findings.
Teaching Methodologies	Lectures, Lab Work
CLO	CLO1 Define and identify concept of physical and mechanical separation processes. CLO2 Discuss the theory, definition and applications of physical and mechanical separation processes. CLO3 Calculate and solve problems involving mass balance on physical separation processes. CLO4 Perform laboratory experiments on separation processes, interpret the experimental data and report experimental findings.
Pre-Requisite Courses	No course recommendations
Topics	
1. Distillation 1.1) Definition and general description of the process 1.2) Physical concepts of distillation. 1.3) Vapor-liquid relationship. 1.4) Ordinary binary mixture for a closed system. 1.5) Relative volatility. 1.6) Batch distillation	
2. Liquid-liquid extraction 2.1) Definition and cases for using liquid-liquid extraction. 2.2) Triangular phase diagram. 2.3) Single-stage extraction. 2.4) Multistage extraction 2.5) Liquid-liquid extraction immiscible solvent case	
3. Gas absorption 3.1) Definition, applications and notations used in gas absorption. Gas-liquid equilibrium for idea solution according to 3.2) Raoult's law. 3.3) Equilibrium solution calculation. 3.4) Equipment and description for as absorption. 3.5) Packed tower –description and flow arrangement. 3.6) Multistage counter-current operation, material balance and calculation based on graphical method. 3.7) Number of theoretical stages- graphical method.	

4. Size reduction and screening

- 4.1) Introduction
- 4.2) Types of equipment used.
- 4.3) Operation

5. Agitation and mixing

- 5.1) Introduction
- 5.2) Types of equipment used
- 5.3) Operation

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment on any topics discussed throughout week 1- 14.	10%	CLO1 , CLO2 , CLO3 , CLO4
	Test	Test on topics discussed in week 10-14	10%	CLO2
	Test	Test on topics discussed in week 1-5	15%	CLO1
	Test	Test on topics discussed in week 6-10	15%	CLO2
	Written Report	Written report on the laboratory works conducted throughout week 1-14.	10%	CLO4

Reading List	Recommended Text	<ul style="list-style-type: none"> • L.McCabe and J.C Smith and P.Harriot, 1993, <i>Unit Operations of Chemical Engineering</i>, 5 th ed Ed., McGraw-Hill New York, • M. Coulson and J.F. Richardson 1990, <i>Chemical Engineering: Unit Operations</i>, 4 th edition Ed., Vol.2, Pergamin Press Oxford
	Reference Book Resources	<ul style="list-style-type: none"> • E. Treybal 1968, <i>Mass-Transfer Operations</i>, 2 nd ed. Ed., McGraw- Hill . New York • Christie john geankoplis 2003, <i>Transport processes and separation process principles</i>, Publisher Prentice hall

Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources