

Material and Energy Balance 1

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	D045
	Target students Division/major/grade	Chemical Engineering/Sophomore	Opening semester	2021 1ST SEMESTER
	Class time and classroom	Tue C(WEB332)Fri C(WEB332)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses	물리학, 화학		
	Recommended concurrent courses	물리화학		
	Related advanced courses	화학공학과 3, 4학년 과정의 전공과목		

Instructor	Name (title/division)		Tae Soup Shim (Associate Professor, Energy Systems Research)			
	Office Room Number	서관 309호	Office phone Number	2574	e-mail	
	Office hours			Homepage address		
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

1. Introduction

2. Course Objectives

물질수지의 원리를 화학공학분야의 공정과 장치에 적용하여 계를 해석할 수 있는 능력을 배양한다.

3. Class types and activities

4. Teaching Method

<input checked="" type="checkbox"/> lecture	<input type="checkbox"/> discussion and debate
<input type="checkbox"/> team project(presentation and case studies)	<input type="checkbox"/> experiments(role-playing,etc)
<input type="checkbox"/> designing and production	<input type="checkbox"/> on-site learning(on-site training)
<input type="checkbox"/> others	

5. Support Systems in Use

<input checked="" type="checkbox"/> AjouBb	<input type="checkbox"/> automatic recording system	<input type="checkbox"/> web-based assignment
<input type="checkbox"/> cyber lecture	<input type="checkbox"/> online content	
<input type="checkbox"/> class behavior analyzing system	<input type="checkbox"/> others	

6. Teaching Tools

<input checked="" type="checkbox"/> PBL(Problem Based Learning)	<input type="checkbox"/> CBL(Case Based Learning)	<input type="checkbox"/> TBL(Team Based Learning)
<input type="checkbox"/> UR(Undergraduate Research)	<input type="checkbox"/> FL(Flipped Learning)	<input type="checkbox"/> DSAL(Data Science Active Learning)
<input type="checkbox"/> others		

7. Knowledge and ability required for taking this course

공학용 계산기를 이용한 연립방정식 풀이법, 엑셀 및 매트랩등을 활용한 간단한 연산 프로그래밍 등의 기본적인 능력이 있으면 좋음.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	10점 만점 기준으로, 3회 초과 결석시 (결석 횟수-3)*(-2)를 감점한다.
midterm exam			
final exam	1	35%	
quiz	2	40%	
presentation			
discussion			
homework	4	15%	
etc			
study hours	6시간		

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Basic Principles and Calculations in Chemical Engineering, 8th ed.	Himmelblau	Prentice Hall	2013
Sub	Elementary Principles of Chemical Processes	Felder and Rousseau	Wiley	2004

10. Class system and Class shedule

공학연산을 위한 기초사항 학습.
 물질수지 및 에너지수지의 원리 학습.
 학습한 내용의 확인을 위하여 다양한 화학공학 계에 원리를 적용하는 훈련을 함.
 공정해석과 설계 능력을 배양함.

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Units and dimension, Engineering system unit, Universal conversion factor gc, Dimensional and nondimensional equations, Dimensional consistency	K	Tae Soup Shim	멀티미디어 활용 강의		

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
2	Mole unit, Conventions in methods of analysis and measurement, Basis, Temperature scales, Temperature conversion	K	Tae Soup Shim	멀티미디어 활용 강의		
3	Relative pressure, Absolute pressure, Pressure conversion, Chemical equation and stoichiometry	K	Tae Soup Shim	멀티미디어 활용 강의		
4	Chemical equation and stoichiometry Test #1	K	Tae Soup Shim	멀티미디어 활용 강의	진도지필평가	
5	Principles of material balance, Analysis of material balance problems Material balance problems without chemical reactions	K	Tae Soup Shim	멀티미디어 활용 강의		
6	Material balance problems without chemical reactions	K	Tae Soup Shim	멀티미디어 활용 강의		
7	Material balance problems with chemical reactions	K	Tae Soup Shim	멀티미디어 활용 강의		
8	Material balance problems involving multiple subsystems Material balance problems with recycles or bypasses	K	Tae Soup Shim	멀티미디어 활용 강의		
9	Material balance problems with recycles or bypasses Purge calculations	K	Tae Soup Shim	멀티미디어 활용 강의		
10	Purge calculations	K	Tae Soup Shim	멀티미디어 활용 강의	진도지필평가	
11	Purge calculations, Test 2	K	Tae Soup Shim	멀티미디어 활용 강의		
12	Material balance problems involving condensation and vaporization	K	Tae Soup Shim	멀티미디어 활용 강의		
13	Material balance problems involving condensation and vaporization	K	Tae Soup Shim	멀티미디어 활용 강의		
14	Material balance problems involving condensation and vaporization	K	Tae Soup Shim	멀티미디어 활용 강의		
15	Material balance problems involving condensation and vaporization	K	Tae Soup Shim	멀티미디어 활용 강의		

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* language : K-korean, E-English

Week s	Topics	lang uag e	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
16	Test #3	K	Tae Soup Shim		기말지필평가	

11. Other items of notification