

## Chemical Engineering Thermodynamics 1

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	D014
	Target students Division/major/grade	Chemical Engineering/Sophomore	Opening semester	2021 2ND SEMESTER
	Class time and classroom	Tue A(WEB303)Fri A(WEB303)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses			
	Recommended concurrent courses			
	Related advanced courses	Chemical Engineering Thermodynamics 2		

Instructor	Name (title/division)		PARK, EUN DUCK(Professor, Energy Systems Research)		
	Office Room Number	West Hall 204	Office phone Number	2384	e-mail
	Office hours	Tuesday 17:00~18:00		Homepage address	<a href="http://home.ajou.ac.kr/homesite/green/">http://home.ajou.ac.kr/homesite/green/</a>
Teaching Assistant	Name (title/division)				
	Office Room Number		Office phone Number	2946	e-mail

### 1. Introduction

Various basic thermodynamic properties of the pure fluid used in the chemical process are taught. The first, second, and third law of thermodynamics are also covered. Moreover, you learn how these thermodynamic properties as well as the laws of thermodynamics can be applied in chemical engineering. Additionally, some problems related to the topics, such as how the thermodynamics can be applied to the fluid flow and how much heat can be converted into the mechanical energy, are dealt with.

### 2. Course Objectives

#### Educational goals

- Understand all the problems related to chemical engineering by using the first, the second, the third law and the characteristic thermodynamic properties of substances.
- Interpret problems related to chemical engineering and cultivate the ability to apply to actual systems.

#### Curriculum of learning outcomes

1. Knowledge of mathematics, basic science, engineering and information technology can be applied.
2. You can understand and analyze the data, plan and conduct experiments.
3. Systems, elements, and processes can be designed to reflect realistic constraints.
4. Recognize engineering problems, formulate and solve them.
5. Skills, methods and tools required for engineering practice are available.

### 3. Class types and activities

### 4. Teaching Method

<input checked="" type="checkbox"/> lecture	<input type="checkbox"/> discussion and debate
<input checked="" 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 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

The ability to deal with differentiation and integral problems and the basic understanding of the physicochemical properties is required.

## 8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam			
final exam			
quiz			
presentation			
discussion			
homework			
etc		100	Test : 60%, Assignment :30%, Attendance & Attitude :10%
study hours			

## 9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Sub	Chemical and Engineering Thermodynamics, 3e	Stanley I. Sandler	John Wiley & Sons, Inc.	1999
Main	Introduction to chemical engineering thermodynamic	J.M. Smith	McGraw-Hill	2001

## 10. Class system and Class shedule

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### < Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction		PARK, EUN DUCK	Lecture		
2	The first law and other basic concepts		PARK, EUN DUCK	Lecture		
3	Volumetric properties of pure liquids (1)		PARK, EUN DUCK	Lecture		

< Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
4	Heat effects		PARK, EUN DUCK	Lecture		
5	project		PARK, EUN DUCK	Class project		
6	project		PARK, EUN DUCK	Class project		
7	The second law of thermodynamics		PARK, EUN DUCK	Lecture		
8	Mid-term exam		PARK, EUN DUCK			
9	Thermodynamoc properties of fluids		PARK, EUN DUCK	Lecture		
10	Applications of thermodynamics to flow processes		PARK, EUN DUCK	Lecture		
11	Production of power from heat		PARK, EUN DUCK	Lecture		
12	Refrigeration and liquefaction		PARK, EUN DUCK	Lecture		
13	Class project		PARK, EUN DUCK	Class project		
14	Class project		PARK, EUN DUCK	Class project		
15	Class project		PARK, EUN DUCK	Class project		
16	Final exam		PARK, EUN DUCK			

11. Other items of notification