

## Special Topics in Chemical Engineering 1

Course Name	Course type (credit/hours)	Elective course(3/3)	Course code	D032
	Target students Division/major/grade	Chemical Engineering/Junior	Opening semester	2020 2ND SEMESTER
	Class time and classroom	Tue D(WEB303)Thu C(WEB303)	English Grade	A(100%English)
Reference to this course	Prerequisite courses	일반화학, 물리화학, 전기화학		
	Related basic courses			
	Recommended concurrent courses			
	Related advanced courses			

Instructor	Name (title/division)		Hwang Jongkook(Assistant Professor, Chemical Engineering)		
	Office Room Number	서관 235호	Office phone Number	0312193846	e-mail
	Office hours			Homepage address	
Teaching Assistant	Name (title/division)				
	Office Room Number		Office phone Number		e-mail

### 1. Introduction

This class is planned to introduce fundamental knowledges for understanding semiconductor materials and relevant technologies and industries.

On the basis of Silicon materials, this lectures will discuss about structural, optical and electronic characteristics of semiconductors, which are essential to understand working principles of modern electronics such as solar cells and lighth emitting diodes. At the end, state-of-the-art technologies based on semiconductor materials will be introduced.

### 2. Course Objectives

### 3. Class types and activities

Lecture note will be provided during the class. Various references and supplementary materials will also be prepared for study.

### 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 checked="" type="checkbox"/> web-based assignment |
| <input checked="" 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 checked="" 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

Basic knowledge about general chemistry, physical chemistry, and electrochemistry (if possible).

## 8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10	
midterm exam	1	25	
final exam	1	35	
quiz	1	20	
presentation			
discussion			
homework	1	10	
etc			
study hours			

## 9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Lecture note			
Main	Principles and Applications of Lithium Secondary Batteries	Jung-Ki Park	Wiley-VCH	2012
Sub	전기화학	오승모	자유아카데미	2019

## 10. Class system and Class shedule

1. 반도체에 대한 기본적 성질 (Introduction of semiconductor materials)
2. 반도체 소재의 구조 및 특성분석 (Structure and characterization of solids)
3. 반도체 소재의 전기적 및 광학적 성질 (Electrical and optical property of semiconductors)
4. 반도체 기술의 최신 기술/연구 동향(State-of-the-art semiconductor researches and technologies)

### < Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction: Electrochemistry and Batteries	E	Hwang Jongkook			
2	Basic concept of electrochemistry	E	Hwang Jongkook			

## < Class Schedule >

\* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
3	Basic concept of electrochemistry	E	Hwang Jongkook			
4	Basic concept of electrochemistry/ Quiz	E	Hwang Jongkook			
5	Thermodynamics / 추석 연휴	E	Hwang Jongkook			
6	Thermodynamics	E	Hwang Jongkook			
7	Kinetics	E	Hwang Jongkook			
8	Mid-term exam	E	Hwang Jongkook			
9	Electrochemical analysis (1)	E	Hwang Jongkook			
10	Electrochemical analysis (2)	E	Hwang Jongkook			
11	Primary batteries	E	Hwang Jongkook			
12	Lithium ion batteries (1)	E	Hwang Jongkook			
13	Lithium ion batteries (2)	E	Hwang Jongkook			
14	Lithium ion batteries (3)	E	Hwang Jongkook			
15	Next generation batteries	E	Hwang Jongkook			
16	Final exam.	E	Hwang Jongkook			

## 11. Other items of notification