

# 2026-Spring Chem. Eng. for Energy & Environment (CHEB214-01) The course syllabus

## 1. Course Information

Course No.	CHEB214	Section	01	Credit	3.00
Category	Major elective	Course Type		prerequisites	
Postechian Core Competence	<input type="checkbox"/> Interpersonal Relationship <input type="checkbox"/> Global Citizenship <input type="checkbox"/> Knowledge Research <input type="checkbox"/> Digital Literacy <input type="checkbox"/> Self Management <input type="checkbox"/> Creative Convergence				
Hours	TUE, THU / 17:00 ~ 18:15 / Environ Bldg[112]Lecture Room			Grading Scale	G

## 2. Instructor Information

	Name	Yoon Chang Won	Department	Dept. of Chemical Eng.
	Email address	cwoon@postech.ac.kr	Homepage	
	Office		Office Phone	
	Office Hours	화요일 18:15 - 18:30		

## 3. Course Objectives

This course introduces key knowledge areas in renewable energy and environmental technologies as addressed in chemical engineering. Focusing on renewable energy systems, energy production and storage technologies, high-efficiency energy devices, and water treatment technologies, the course aims to enhance students' understanding of chemical engineering by presenting fundamental engineering principles together with representative applications and research case studies.

본 강의는 화학공학과에서 다루는 신재생에너지 기술 및 환경 기술과 연계되는 지식을 소개하는 과목이다. 신재생에너지 및 에너지 생산/저장 기술, 고에너지효율 소자 기술, 수질 처리 환경 기술 등을 중심으로 공학적 기본 원리와 응용 연구 사례들을 소개함으로써 화학공학에 대한 학생들의 이해를 돕고자 한다.

## 4. Prerequisites & require

Prerequisite: General Chemistry

## 5. Grading

Midterm Exam	Final Exam	Attendance	Assignment	Project	Presentation/Discussion	Laboratory/Practice	Quiz	Others	Total
비고		Attendance (30%), Midterm Exam (35%), Final Exam (35%) 출석(30%), 중간고사(35%), 기말고사(35%)							

## 6. Course Materials

Title	Author	Publisher	Publication Year/Edition	ISBN
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## 7. Course References

No official textbook is used in this class.

1. C. H. Bartholomew, R. J. Farrauto, "Fundamentals of Industrial Catalytic Processes" Second Edition, John Wiley & Sons (2006).
2. C. Comninellis, G. Chen, "Electrochemistry for the Environment". Springer (2009)
3. Recent Research Papers

## 8. Course Plan

- (Important) Certain topics may be adjusted depending on the progress of the course.

[Weeks 1-4] Energy, Environment, and Chemical Engineering

- Overview of global energy and environmental issues and their connection to chemical engineering
- Energy-related chemical engineering technologies: shale gas utilization and hydrogen production
- Environmental chemical engineering technologies: mitigation of carbon dioxide and NOx emissions
- Next-generation energy and environmental technologies: catalytic processes

[Weeks 5-7] Hydrogen Energy I

- Hydrogen production
- Hydrogen storage I

[Week 8] Midterm Examination

[Weeks 9-11] Hydrogen Energy II

- Hydrogen storage II
- Hydrogen utilization

[Weeks 12-13] Water and Air Environment

- Water pollution and water treatment technologies
- Photochemical and biochemical water treatment processes
- Electrochemical water treatment technologies
- Air quality control technologies

[Weeks 14-15] Energy Storage

- Secondary batteries and next-generation battery systems
- Large-scale energy storage technologies

[Week 16] Final Examination

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 - (중요) 강의 내용의 일부는 조정될 수 있음 - (Important Note: Some of the lecture content could be adjusted)

(1주~4주) 에너지, 환경, 화학공학

- 에너지 및 환경 이슈와 화학 공학 기술의 이해
- 에너지 관련 화학공학 기술: 세일 가스 활용 및 수소 생산 기술
- 환경 관련 화학공학 기술: 이산화탄소 및 NOx 저감
- 차세대 에너지/환경 기술: 촉매 기술

(5주~7주) 수소에너지 I

- 수소생산
- 수소저장 I

(8주) 중간 고사

(9주~11주) 수소에너지 II

- 수소저장 II
- 수소활용

(12주~13주) 수질 대기 환경

- 수질 오염과 수질 처리 환경기술의 이해
- 수처리 광화학 기술, 생화학 기술
- 수처리 전기화학 기술
- 대기 환경 기술

(14주~15주) 에너지저장

- 이차전지, 차세대 배터리
- 대용량 에너지저장 기술

(16주) 기말 고사

## 9. Course Operation

Lecture: In principle, face-to-face lectures, but online lectures and VOD lectures are planned in parallel.

- This course may be delivered through a combination of in-person and online instruction.
- Invited lectures by external experts could be included.
- No required textbooks. Lecture notes and additional materials will be distributed if needed.

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- 강의 유형: 대면강의가 원칙이나, 온라인 강의 및 VOD 강의 병행 예정
  - 외부 강사를 초청을 통한 강의 진행을 포함할 수 있음

## 10. How to Teach & Remark

## 11. Supports for Students with a Disability

- Taking Course: interpreting services (for hearing impairment), Mobility and preferential seating assistances (for developmental disability), Note taking(for all kinds of disabilities) and etc.
- Taking Exam: Extended exam period (for all kinds of disabilities, if needed), Magnified exam papers (for sight disability), and etc.
- Please contact Center for Students with Disabilities (279-2434) for additional assistance