

# 2025-Fall Advanced Hydrogen Energy (CHEB563-01) The course syllabus

## 1. Course Information

Course No.	CHEB563	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 /			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	매주 목요일 16:30 ~ 17:00 (변동 가능)		

## 3. Course Objectives

In response to the global issue of climate change, countries around the world are actively developing technologies aimed at achieving carbon neutrality. This course aims to provide foundational knowledge of hydrogen energy and low-carbon technologies—two key areas essential for realizing carbon neutrality. Through this course, students will be equipped with the expertise necessary to contribute to the future development of green energy, fostering the next generation of professionals in the field.

[현재 전세계는 글로벌 이슈로 대두되고 있는 기후변화에 효과적으로 대응하기 위하여 탄소중립을 위한 기술개발을 추진하고 있다. 본 강의는 탄소중립기술 실현에 필요한 대표적인 기술인 수소에너지 및 저탄소 기술에 대한 지식을 제공하고, 이를 통해 향후 그린에너지 전문가 양성에 기여하는 것을 목표로 한다.]

## 4. Prerequisites & require

To effectively understand the content of this course, prior knowledge in general chemistry, organic chemistry, inorganic chemistry, and physical chemistry is required.

[본 강의에 내용은 효과적으로 이해하기 위해서는 학부 수준의 일반화학, 유기화학, 무기화학, 물리화학 지식이 요구됨.]

## 5. Grading

Midterm Exam	Final Exam	Attendance	Assignment	Project	Presentation/Discussion	Laboratory/Practice	Quiz	Others	Total
비고		Evaluation: Attendance (30%), Presentation Assignments and Research Proposal (70%). Each student is expected to give 1~2 presentations. The number of presentations and the grading proportions is subjected to be adjusted depending on the number of students enrolled.							

\*(Presentation Evaluation): Graduate students will be required to study and present recent research papers in the fields of hydrogen production, storage, utilization, and low-carbon technologies 'outside their own research areas.' These presentations will serve as a platform for class discussions, enabling students to share knowledge and engage in interdisciplinary academic exchange.

[평가방법: 출석 (30%), 발표과제 + 연구계획서 작성 및 제출 (70%; 발표 1-2회; 수강생 수에 따라 발표 횟수 및 평가 비율 조정 예정)]

\*(발표 평가) 대학원생이 '본인 연구 분야가 아닌' 수소생산/저장/활용 및 저탄소 분야의 최신 논문을 공부한 후 발표하는 과제를 수행할 예정이며, 본 발표를 통해 수강생들이 토론하며 지식을 공유하는 방식으로 수업을 운영할 예정

## 6. Course Materials

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

There is no designated textbook for this course. Core concepts will be delivered through lecture slides. Additional reference materials (such as academic papers) and handouts will be provided as needed.

[강의교재는 없으며, 강의 슬라이드를 통해 기본적인 핵심 지식을 제공할 계획임 (필요시 참고문헌(논문) 및 handouts 자료를 배포할 예정).]

## 8. Course Plan

### Course Schedule

Week 1: What is Hydrogen Energy?

Week 2: Hydrogen Production Technologies I – Fossil Fuel-Based Hydrogen Production

Week 3: Hydrogen Production Technologies II – Water Electrolysis-Based Hydrogen Production

Week 4: Hydrogen Storage and Transportation Technologies I – Physical Hydrogen Storage

Week 5: Hydrogen Storage and Transportation Technologies II – Chemical Hydrogen Storage

Week 6: Presentation Evaluation 1 / Presentation Evaluation 2

Week 7: Presentation Evaluation 3 / Presentation Evaluation 4

Week 8: Presentation Evaluation 5 / Presentation Evaluation 6

Week 9: Applications of Chemical Hydrogen Storage

Week 10: Hydrogen Utilization Technologies – Fuel Cells

Week 11: Overview of Low-Carbon Technologies

Week 12: Carbon Capture, Utilization, and Storage (CCUS)

Week 13: Chemical Processes for Hydrogen and Low-Carbon Energy Technologies

Week 14: Presentation Evaluation 7 / Presentation Evaluation 8

Week 15: Presentation Evaluation 9 / Presentation Evaluation 10

Week 16: Presentation Evaluation 11 / Presentation Evaluation 12

## 9. Course Operation

- The course will primarily be conducted through in-person classes; however, online sessions may be arranged if necessary.
- Teaching methods include lectures, student presentations, and discussions. Team projects may also be organized when appropriate.
- Guest speakers with expertise in relevant fields may be invited to present real-world applications and engage in in-depth discussions with students.

\*(Presentation Evaluation): Graduate students will be required to study and present recent research papers in the fields of hydrogen production, storage, utilization, and low-carbon technologies 'outside their own research areas.' These presentations will serve as a platform for class discussions, enabling students to share knowledge and engage in interdisciplinary academic exchange.

- 수업운영은 대면수업이 원칙이며, 필요시 비대면 수업을 추진할 예정
- 교수방법: 이론강의, 발표 및 토론 (필요시 팀프로젝트 운영)
- 외부 전문가 초청을 통한 응용 예를 소개하고, 전문 영역을 함께 논의할 수 있는 기회 제공
- \*(발표) 대학원생이 '본인 연구 분야가 아닌' 수소생산/저장/활용 및 저탄소 분야의 최신 논문을 공부한 후 발표하는 과제를 수행할 예정이며, 본 발표를 통해 수강생들이 토론하며 지식을 공유하는 방식으로 수업을 운영할 예정

## 10. How to Teach & Remark

In addition to providing core knowledge on hydrogen and low-carbon energy technologies, this course will introduce real-world applications through guest lectures by external experts. This approach is intended to help students understand how the knowledge gained in class is applied in practice.

[본 강의를 통한 수소저탄소에너지 핵심 지식 제공과 더불어, 외부 전문가 초빙을 통한 실제 응용 사례를 소개함으로써 수강생들에게 지식이 어떻게 응용되는지 학습할 예정임.]

## 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