Syllabus [2025Year 1 Term]

Course Information

Course Title	Environmental Chemical Process	Credits	3
Course Code	549960-1	Required/Elective (For Undergraduate Courses)	Selective majors
Department or Major	Department of Chemical Engineering	Language	English
Methods of Teaching		Lecture Room	화12,13,14/목9,10,11(3공516)
Time Allotment	Lecture(2) Experiments(0) Trainging & Practice(0) Performance(0) Designing & Planning(1)	Cyber Lectures	
Course Type	offline		

Lecturer

Lecturer	Name	Seon Yeop Jung	Rank	Assistant Professor	Final Academic Degree	공학박사
	Department & college	Public Facilities Center		Office	College of Engineering - Building 3 212	
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	Field of Interest					

Course Summary

Course Description	Through the third and fourth industrial revolutions, we are living a more pleasant and abundant life, however, we are also urged to solve tough environmental problems such as climate change, global warming, extreme weather and natural disasters, water scarcity, and environmental migrants. Environmental engineering is the study of developing technical solutions to environmental problems using the principles of science and technology. It deals with air and water pollution, solid waste, noise, vibration, soil, groundwater, and marine environment. In this course, students will learn how to apply the material and energy balances — basic concepts in the chemical engineering discipline — to describe the discharge and mitigation of various pollutants. Since carbon neutrality has become the most important mission for human survival, advanced topics on electricity generation, battery, rare-earth elements recovery, and waste plastic pyrolysis will also be covered in this course.
Description Related Courses	Students are encouraged to have taken Chemical Engineering Stoichiometry (437130), Fluid Mechanics (437320), and Heat and Mass Transfer (376650).

	This course is related to Separation Process (497940), Environmental Chemical Engineering (448270), and Electrochemical Science & Technology (400440).
Course Goals	1. To construct the mass and energy balances for a given unit operation 2. To solve the differential equations with appropriate assumptions 3. To explain the difference between water and wastewater treatment technologies 4. To explain technologies for the discharge and mitigation of pollutants (i.e., air, water, and solid wastes)
Projected Results	Students will be able to construct the mass and energy balances for a given unit operation.
Percentage of the original language classes(%)	English

Syllabus

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
1	Introduction		강의,	
2	Mass balance		강의,	
3	Mass balance		강의,	
4	Energy balance		강의,	
5	Environmental chemistry		강의,	
6	Mathematics of growth		강의,	
7	Water pollution		강의,	
8	Midterm exam		문제해결학습(BPL),	
9	Water quality control		강의,	
10	Water quality control		강의,	
11	Air pollution		강의,	
12	Solid waste management and resource recovery		강의,	
13	Recent topics in the environmental aspect of chemical processes		팀기반학습(TBL),	
14	Recent topics in the environmental aspect of chemical processes		팀기반학습(TBL),	
15	Final exam		문제해결학습(BPL),	

Methods of Grading

sequence	Description	Percentage	Details
1	Mid-tem Exam	30%	
All		100%	

sequence	Description	Percentage	Details
2	Final-exam	30%	
3	Pop Quizzes	0%	
4	Assignments	0%	
5	Reports	0%	
6	Presentations & Discussions	30%	
7	Attendance	10%	
8		0%	
9	Others	0%	
All		100%	

Core of Value

핵심가치	전공역량	역량정의	역량구분	값(%)
혁신 (Discovery)	창의적문제해결 (Creative problem-solving)	주어진 상황과 문제를 창의적으로 해결할 수 있는 능력		0%
혁신 (Discovery)	도전 (Challenging)	전공 지식을 새로운 분야와 융합하고 아우를 수 있는 능력		0%
혁신 (Discovery)	지식융합 (Knowledge convergence)	새로운 분야를 개척하거나 도전적으로 임할 수 있는 능력		0%
헌신 (Dedication)	세계시민 (Universal value)	세계 공동체 구성원으로 전공자로서 국제적 이슈에 대응할 수 있는 능력		0%
헌신 (Dedication)	상호협력 (Cooperation)	공동의 목적 달성을 위해 타인과 상호협력을 할 수 있는 능력		0%
헌신 (Dedication)	공동체 (Sense of community)	공동체의 구성원으로서 필요한 태도와 윤리의식을 가질 수 있는 능력		0%
능동 (self- Determination)	자기주도 (Self-Managing)	주어진 상황과 문제를 주도적이고 능동적으로 해결할 수 있는 능력	부역량	20%
능동 (self- Determination)	지식활용 (Knowledge application)	주어진 상황과 문제에 대해 논리적으로 파악하고 분석할 수 있는 능력	부역량	30%
능동 (self- Determination)	논리적사고 (Logical thinking)	전공관련 지식을 필요에 따라 다양하게	주역량	50%

핵심가치	전공역량	역량정의	역량구분	값(%)
		적용하고 활용할 수 있는 능력		
능동 (self- Determination)	의사소통 (Articulation)	대화를 통해 다양한 의견을 조율하고 합의를 이끌어 낼 수 있는 능력		0%

Textbook(s) & References

Description	Title	Author	Publisher
Required Textbook	Introduction to Environmental Engineering and Science	Gilbert M. Masters	Pearson

Memo

- Instruction: the course will focus on the concept each week and how to solve the examples.
- Group activity: each group will perform an academic project and will present their results at the end of the semester.