Reaction Engineering 1

Course Name	Course section (credit/hours)	Required course(3/3)		course code	D042
	course item			course component	
	Target students Division/major/grade			opening semester	2021 1ST SEMESTER
	Class time and classroom	Tue A(WEB303)Fri A(WEB303)		English Grade	A(100%English)
Reference to this course	Credit compositon	Theory(2) + Design(1) + Practice(0)			
	Prerequisite courses	물리화학			
	Related basic courses				
	Recommanded concurrent courses				
	Related advanced course	반응공학2			

Instructor	Name (title/division)	PARK, EUN DUCK(Professor, Energy Systems Research)				
	Office Room Number	서관 204호	Extension Number	2384	e-mail	edpark@ajou.ac.kr
	Office hour	화요일 17:00-18:00		Homepage address	http://home.ajou.ac.kr/homesite/green/	
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

1. Course Introduction

The objective of this course is to help students to understand the chemical reaction phenomena as well as the basic principles for the reactor design. Students will learn some important topics including chemical reaction kinetics, heat and mass transfer. The analysis for the ideal reactors will be conducted.

2. Course Objectives & course outcome

1. Course objective
Based on reaction kinetics as well as material and energy balance, students can design the ideal reactors under given constraints.

2. Course accomplishment
1.We can apply the knowledge on mathematics, basic science, and engineering as well as the information technology to the chemical engineering problems.

2.We can understand and analyze the information on chemical reaction engineering and plan and carry out the experiment related to chemical reaction engineering.

3.We can design the system, components, and process based on the real constraints.

4.We can understand, formulate, and solve the chemical reaction engineering.
5.Wecanutilizethetechniques,methods,andtoolsnecessaryforchemicalengineeringthermodynamics.

3. Class types and activities

The lecture will proceed based on the textbooks.
The lecturer will encourage questions from students.
All the students will participate the team design projects and have an opportunity to present their work.
The examination will be taken after each chapter to evaluate the students' comprehension on the important issues.

4. Teaching Method

- [V] lecture
- [V] team project(presentation and case studies)
- [V] designing and production
- [ ] others
- [ ] discussion and debate
- [ ] experiments(role-playing,etc)
- [ ] on-site learning(on-site training)

5. Support Systems in Use

- [V] AjouBb
- [ ] cyber lecture
- [ ] class behavior analyazing system
- [ ] automatic recording system
- [ ] online content
- [ ] others
- [ ] web-based assignment

6. Teaching Tools

- [V] PBL(Problem Based Learning)
- [ ] UR(Undergraduate Research)
- [ ] others
- [ ] CBL(Case Based Learning)
- [ ] FL(Flipped Learning)
- [V] TBL(Team Based Learning)
- [ ] DSAL(Data Sciencd Active Learning)

7. Evaluation method of course outcome

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	출석 및 태도
midterm exam			
final exam			
quiz			

7. Evaluation method of course outcome

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
presentation	2회	30%	설계과제 수행 및 발표: 2회 보고서도 포함해서 평가함.
discussion			
homework			
etc		60%	진도 고사
study hours			

8. Textbook and Reference material

Main/Sub	Title	Writer	Publisher	Publication year
Sub	Chemical Reaction Engineering	Octave Levenspiel	John Wiley & Sons	1999
Main	Elements of Chemical Reaction Engineering	H. Scott Fogler	Prentice-Hall Intern	1999

9. Class system and Class shedule

< Schedule >

* language : K-korean, E-English

Weeks	Title of lecture	language	time distribution(minutes)			Teaching Method	evaluation method
			theory	design	experiment practice		
1	Introduction & Mole Balance	E	3			lecture	
2	Conversion and Reactor sizing	E	3			lecture	
3	Rate Laws and Stoichiometry	E	3			lecture	
4	Rate Laws and Stoichiometry	E	3			lecture	
5	Isothermal Reactor Design	E	3			lecture	
6	Isothermal Reactor Design	E	3	2		Project	
7	Isothermal Reactor Design	E	3	3		Project	Project evaluation
8	중간고사	E	3			mid-term exam.	

< Schedule >

* language : K-korean, E-English

Weeks	Title of lecture	language	time distribution(minutes)			Teaching Method	evaluation method
			theory	design	experiment practice		
9	Collection and Analysis of rate data	E	3			lecture	
10	Multiple Reactions	E	3			lecture	
11	Reaction Mechanism, Pathways, Rioreactions and Bioreactors	E	3			lecture	
12	Reaction Mechanism, Pathways, Rioreactions and Bioreactors	E	3	1		Project	
13	Nonisothermal Reactor Design	E	3	3		Project	
14	Nonisothermal Reactor Design	E	3	3		Project	
15	Nonisothermal Reactor Design	E	3	3		Project	Project evaluation
16	기말고사	E	3			Final exam.	

10. Contribution index of the course for attaining ABEEK program outcomes

course outcome	contribution scale
No Data	

11. Analysis of improved matters for the previous semester

12.2 Training contents for design & experiment

No	2501 1576	Title	Design for the ideal isothermal reactor
content	Each group can select one representative chemical reaction and design the ideal isothermal reactor to produce the product whose amount is corresponding to that consumed in the domestic market annually.		
composition factor for design & experiment	설정,합성,분석,평가,보고,		
Realistic restriction factor	경제,		
evaluation method & reference	Report and Presentation(100%)		
No	2501 1577	Title	Design for the ideal nonisothermal reactor
content	Each group can select one representative chemical reaction and design the ideal nonisothermal reactor to produce the product whose amount is corresponding to that consumed in the domestic market annually.		
composition factor for design & experiment	설정,합성,분석,평가,보고,		
Realistic restriction factor	경제,		
evaluation method & reference	Report and Presentation(100%)		

13. Reference items