Transport Phenomena

Course Name	Course section (credit/hours)	Elective course(3/3)		course code	D037
	course item			course component	
	Target students Division/major/grade			opening semester	2021 1ST SEMESTER
	Class time and classroom	Mon D(WEB303)Thu D(WEB303)		English Grade	A(100%English)
Reference to this course	Credit compositon	Theory(3) + Design(0) + Practice(0)			
	Prerequisite courses				
	Related basic courses				
	Recommanded concurrent courses				
	Related advanced course	화학공정모델링(Modeling and Simulation in Chemical Engineering)			

Instructor	Name (title/division)	Chee Burm Shin(Professor, Energy Systems Research)				
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Teaching Assistant	Name (title/division)					
	Office Room Number	화공실험동 205-1	Office phone Number	2949	e-mail	bobob121@ajou.ac.kr

1. Course Introduction

The purpose of this course is to present the principles and applications of fluid mechanics, heat transfer, and mass transfer based on the conservation laws ofmomentum, energy, and mass. This course is to provide a solid foundation to analyse and design the chemical processes such as materials processing, microelectronics processing, biochemical engineering, environmental engineering, and more.

2. Course Objectives & course outcome

Course objective
-Instruction ofthe principles and applications of transport phenomena in chemical engineering perspectives

Course outcomes
-Understanding of the principles of transport phenomena
-Derivation of the governing equations of the transport processes
-Obtaining of the solutions of the derived equations for the transport processes
-Application of the principles of transport phenomena to the design and analysis of the processes and equipments involving trasnport phenomena

3. Class types and activities

4. Teaching Method

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

5. Support Systems in Use

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

6. Teaching Tools

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

7. Evaluation method of course outcome

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam	1	45%	
final exam	1	45%	
quiz			

7. Evaluation method of course outcome

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
presentation			
discussion			
homework	Homeworks	10%	
etc			
study hours			

8. Textbook and Reference material

Main/Sub	Title	Writer	Publisher	Publication year
Main	Fundamentals of Momentum, Heat, and Mass Transfer	Welty, Wicks, Wilson, Rorrer	John Wiley and Sons	2008
Sub	Transport Phenomena	Bird, Stewart, Lightfoot	John Wiley and Sons	2002

9. Class system and Class shedule

The course will proceed in the following order:
1) System definition according to the problem constraints
2) Application of the conservation laws of momentum, energy and mass to the system
3) Derivation of the differential equations based on conservation laws
4) Solving the differential equations
5) Verification the validity of the solutions
6) Application of the above procedures for the design and analysis of chemical processes and equipments

< Schedule >

* language : K-korean, E-English

Weeks	Title of lecture	language	time distribution(minutes)			Teaching Method	evaluation method
			theory	design	experiment practice		
1	Fundamentals of Momentum Transfer	E	3	1		Lecture, Design project	
2	Inviscid Flow and Viscous flow	E	3	1		Lecture, Design project	
3	Velocity Distributions in Laminar Flow	E	3	1		Lecture, Design project	
4	Velocity Distributions in Turbulent Flow	E	3	1		Lecture, Design project	
5	Fundamentals of Heat Transfer	E	3	1		Lecture, Design project	

< Schedule >

* language : K-korean, E-English

Weeks	Title of lecture	language	time distribution(minutes)			Teaching Method	evaluation method
			theory	design	experiment practice		
6	Steady-State and Unsteady-State Conduction	E	3	1		Lecture, Design project	
7	Convective Heat Tranfer	E	3	1		Lecture, Design project	
8	Mid. Term	E	3				
9	Heat Transer Equipment	E	3	1		Lecture, Design project	
10	Radiation Heat Transer	E	3	1		Lecture, Design project	
11	Fundamentals of Mass Transfer	E	3	1		Lecture, Design project	
12	Convective Mass Transfer	E	3	1		Lecture, Design project	
13	Mass Transfer Equipment	E	3	1		Lecture, Design project	
14	Presentation of Design Project I	E	3	3		Presentation of design project an discussion	
15	Presentation of Design Project II	E	3	3		Presentation of design project an discussion	
16	Final Exam.	E	3				

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 1743	Title	
content			
composition factor for design & experiment			
Realistic restriction factor			
evaluation method & reference			

13. Reference items
