Transport Phenomena

Course Name	Course type (credit/hours)	Elective course(3/3)	Course code	D022
	Target students Division/major/grade	Chemical Engineering/Senior	Opening semester	2018 1ST SEMESTER
	Class time and classroom	Tue D(WEB332)Thu C(WEB332)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses			
	Recommended concurrent courses			
	Related advanced courses	화학공정모델링(Modeling and Simulation in Chemical Engineering)		

Instructor	Name (title/division)	Chee Burm Shin(Professor, Energy Systems Research)				
	Office Room Number	서관 201	Office phone Number	2388	e-mail	
	Office hours	화,수,목 오후3-5시		Homepage address	http://matproc.ajou.ac.kr	
Teaching Assistant	Name (title/division)					
	Office Room Number	화공실험동 205-1	Office phone Number	2949	e-mail	etaranger@ajou.ac.kr

1. 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 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

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

7. Knowledge and ability required for taking this course

-Basic knowledges in physics, physical chemistry, chemical engineering thermodynamics1,2, fluid mechanics, heat transfer, and mass transfer
-Basic knowledge in units of physical quantities and their conversion
-Understanding of the graphs and tables of physical and chemical properties

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam	1	45%	
final exam	1	45%	
quiz			
presentation			
discussion			
homework	Homeworks	10%	
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	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

10. 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

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Fundamentals of Momentum Transfer	E	Chee Burm Shin	Lecture, Design project		
2	Inviscid Flow and Viscous flow	E	Chee Burm Shin	Lecture, Design project		
3	Velocity Distributions in Laminar Flow	E	Chee Burm Shin	Lecture, Design project		

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
4	Velocity Distributions in Turbulent Flow	E	Chee Burm Shin	Lecture, Design project		
5	Fundamentals of Heat Transfer	E	Chee Burm Shin	Lecture, Design project		
6	Steady-State and Unsteady-State Conduction	E	Chee Burm Shin	Lecture, Design project		
7	Convective Heat Tranfer	E	Chee Burm Shin	Lecture, Design project		
8	Mid. Term	E	Chee Burm Shin			
9	Heat Transer Equipment	E	Chee Burm Shin	Lecture, Design project		
10	Radiation Heat Transer	E	Chee Burm Shin	Lecture, Design project		
11	Fundamentals of Mass Transfer	E	Chee Burm Shin	Lecture, Design project		
12	Convective Mass Transfer	E	Chee Burm Shin	Lecture, Design project		
13	Mass Transfer Equipment	E	Chee Burm Shin	Lecture, Design project		
14	Presentation of Design Project I	E	Chee Burm Shin	Presentation of design project an discussion		
15	Presentation of Design Project II	E	Chee Burm Shin	Presentation of design project an discussion		
16	Final Exam.	E	Chee Burm Shin			

11. Other items of notification