이화여자대학교
EWHA WOMANS UNIVERSITY

Syllabus (2022-Summer)

Course Title	Catalytic Process Engineering	Course No.	
Credit	3 credits	Hours	45 Hours
Class Time Classroom	Mon to Thr Classroom TBA		
Instructor	Name : Woo-Jae Kim	Department : Chem. Eng. & Mater. Sci.	
	E-mail : wjkim1974@ewha.ac.kr	Phone : 02-3277-4327	
Office Hours Office Location	Anytime, but by appointment only (email)		

I. Course Overview

1. Course Description

Heterogeneous catalysis plays a very important and defining role in most of the chemical industry. This course will be very useful for undergraduate to understand heterogeneous catalytic processes. This course starts with basics of catalysis and goes deeper into various aspects of catalytic preparation and characterization techniques. Aspects of catalytic testing and reactor types are to be included. The topics will also include study of reaction mechanism and kinetics of the heterogeneous catalytic reactions. New developments in catalysis will be covered. Concept of Fuel cell catalysts, monolith catalysts and nano-catalysts will be introduced.

2. Prerequisites

3. Course Format

Lecture	Discussion/Presentation	Experiment/Practicum	Field Study	Other
100 %	%	%	%	%

4. Course Objectives

The objective of this course is to learn and apply knowledge of the chemical structure and reactivity of industrial catalysts, with particular emphasis placed upon combining reaction kinetics, process conceptualization, and heat and mass transfer. Engineering principles employed for the design and operation of industrial processes will be discussed, including the development of reaction rate expressions using knowledge of reaction mechanisms, and the integration of these kinetic expressions with mass transfer principles.

5. Evaluation Systems

☐ Relative evaluation ■ Absolute evaluation (for Ewha International Summer College students only) ☐ Others

Midterm Exam	Final Exam	Quizzes	Presentation	Projects	Assignments	Participation	Others
40 %	40 %	%	%	%	10 %	10 %	%

II. Course Materials and Additional Readings

1. Required Materials
"촉매란 무엇인가?", 문상흡, 신은우, 김우재, 조한익 저, 사이플러스 (2021)

2. Supplementary Materials
Hand out

3. Optional Additional Readings

III. Course Schedule

Day	Date	Topics & Class Materials, Assignments
Day 1	(6/30)	Introduction to Catalyst and Its Applications
Day 2	(7/4)	History of Catalyst 1
Day 3	(7/5)	History of Catalyst 2
Day 4	(7/6)	Catalyst Selection Rule 1
Day 5	(7/7)	Catalyst Selection Rule 2
Day 6	(7/11)	Catalytic Cracking
Day 7	(7/12)	Catalytic Cracking
Day 8	(7/13)	**Midterm Exam**
Day 9	(7/14)	Catalytic Hydrogenation
Day 10	(7/18)	Catalytic Partial Oxidation
Day 11	(7/19)	Catalytic Reforming
Day 12	(7/20)	Catalyst for Future – Automotive Catalyst (Air Pollutant Control Applications)
Day 13	(7/21)	Catalyst for Future – Fuel Cell and Photocatalyst
Day 14	(7/25)	Catalyst for Future – Renewable Energy Applications (incl. H_2 production catalyst)
Day 15	(7/26)	**Final Exam**

Day	Date	Topics & Class Materials, Assignments
Makeup Classes 1	(mm/dd)	
Makeup Classes 2	(mm/dd)	

IV. Special Accommodations

* According to the University regulation section #57-3, students with disabilities can request for special accommodations related to attendance, lectures, assignments, or tests by contacting the course professor at the beginning of semester. Based on the nature of the students' request, students can receive support for such accommodations from the course professor or from the Support Center for Students with Disabilities (SCSD). Please refer to the below examples of the types of support available in the lectures, assignments, and evaluations.

Lecture	Assignments	Evaluation
. Visual impairment: braille, enlarged reading materials . Hearing impairment: note-taking assistant . Physical impairment : access to classroom, note-taking assistant	Extra days for submission, alternative assignments	. Visual impairment: braille examination paper, examination with voice support, longer examination hours, note-taking assistant . Hearing impairment: written examination instead of oral examination . Physical impairment: longer examination hours, note-taking assistant

- Actual support may vary depending on the course.

* The contents of this syllabus are not final—they may be updated.