

<<Last Updated:2022/09/23>>

Course Schedule Information

Course Code	881132
Semester	Spring and Summer Term
Day and Period	Tue2
Course Name (Japanese)	触媒化学入門
Room	School of Engineering Science/Lecture Room B104
Course Name	Introduction to Catalytic Chemistry
Capacity	0
Course Numbering Code	88INES9U100
Required/Optional	
Credits	2.0
Student Year	1,2,3,4,5,6
Field	
Instructor	MIZUGAKI Tomoo
Course of Media Class	Not Applicable

※About Course of Media Class

"Course of Media Class" are classes in which more than half of the classes are held in places other than classrooms by making advanced use of various media.

Undergraduate students can include up to 60 credits in media class course as requirements for graduation.

Even if this is not the case, we may hold classes using the media.

Detailed Syllabus Information

Course Subtitle	Introduction to Catalytic Chemistry	
Language of the Course	English	
Type of Class	Lecture Subject	
Course Objective	The main objective of this course is to provide a better understanding of the scientific basis and applications of catalytic chemistry. The introduction contains the history of the development of catalysis and describe how catalysts are used in relation to the development of society. In particular, the course will help students understand the relationship between the chemical industry, resources, energy, and environmental issues and catalysis, and will also introduce current state-of-the-art catalytic research. Student proposals and discussions will be required.	
Learning Goals	By the end of this course, you should be able to : 1. explain the fundamentals of catalytic chemistry, 2. describe the the importance of catalysis in relation to resource and energy issues.	
Requirement / Prerequisite	N/A	
Class Plan	1st	Title:Introduction
		An overview of this course and fundamentals of catalytic chemistry will be introduced.
		Instructor :
	2nd	Title:Global problems relating chemistry
		Relation of chemistry with economy, natural resource, wastes, energy... is discussed.
		Instructor :
3rd	Title:Catalysis and Chemical Industry 1	

	Petroleum and natural gas process are introduced.
	Instructor :
4th	Title:Catalysis and Chemical Industry 2
	Organic and inorganic chemicals production is described.
	Instructor :
5th	Title:Catalysis and Chemical Industry 3
	Fine chemicals, pharmaceuticals polymers, plastics industries are introduced.
	Instructor :
6th	Title:Catalysis and Green Chemistry
	Basic concept of Green chemistry is introduced.
	Instructor :
7th	Title:Catalysis for utilization of natural resource
	Recent approaches for natural gas, shale gas, oil conversion is introduced.
	Instructor :
8th	Title:Catalysis for utilization of renewable resource
	Biomass utilization is described.
	Instructor :
9th	Title:Environmental catalysis
	Catalysis against air pollution
	Instructor :
10th	Title:Catalysis for energy conversion 1
	Introduction of photocatalysis for H ₂ generation
	Instructor :
11th	Title:Catalysis for energy conversion 2
	Introduction of fuel cell
	Instructor :
12th	Title:Catalysis for CO ₂ reduction
	Introduction to CO ₂ reduction is described.
	Instructor :
13th	Title:Catalysis for plastics economy
	Introduction to the challenge of plastics recycling and upglading
	Instructor :
14th	Title:Nanoscience in catalysis
	Synthesis and characterization of nano-sized catalysts, recent development
	Instructor :
15th	Title:Future of catalysis
	discussion on role of catalysis to achieve SDGs
	Instructor :
Independent Study Outside of Class	Additional reading material will be posted before the lectures.
Textbooks	
Reference	
Grading Policy	Final evaluations will be based on short quizzes (30% of a total evaluation), a short report (15%), a final report (20%), and in-class presentation and discussion (35%).
Attendance and Student Conduct Policy*	
Other Remarks	Students are encouraged to send an e-mail for any questions related to the material covered in the class.

Special Note	If you need special consideration when taking this course, please consult with the university office in advance and notify the instructor of the class at the earliest opportunity.
Office Hour	Students are encouraged to send an e-mail for any questions related to the material covered in the class.
Keywords	catalytic chemistry, chemical industry, green chemistry, sustainable chemistry
Messages to Prospective Students	The technical depth of the content will be adjusted depending on the background knowledge of the students in the class. The various topics will be studied not only from the stand point of chemistry, but social sciences, basic sciences and engineering.
Course conducted by instructors with practical experience	

Instructor(s)

Instructor Name	Name (hiragana)	Affiliation, Title, Course	Office	Extension	E-mail
Tomoo Mizugaki	みずがき ともお	Department of Engineering Science, Professor	C429	6260	mizugaki.tomoo.es@osaka-u.ac.jp

Cautions for Students

※出欠席及び受講に関するルール：令和5年度以降のシラバス項目 / *Attendance and Student Conduct Policy: field available from FY2023