

Oyama College		Year	2022	Course Title	Catalytic Chemistry
Course Information					
Course Code	0003		Course Category	Specialized / Elective	
Class Format	Lecture		Credits	Academic Credit: 2	
Department	Advanced Course of Materials Chemistry and Bioengineering		Student Grade	Adv. 1st	
Term	Second Semester		Classes per Week	2	
Textbook and/or Teaching Materials	Organometallics Chemistry -Full of Variety and Unexpectedation- by Sanshiro KOMIYA, Takao IKARIYA (SHOKABO Tokyo)				
Instructor	NISHII Kei				
Course Objectives					
1. Understand and be able to explain the general chemical properties of catalysts 2. Understand and be able to explain about organometallic complexes 3. Understand industrial catalytic reactions and be able to explain them with specific examples					
Rubric					
	Ideal Level		Standard Level		Unacceptable Level
Achievement 1	Understand and be able to accurately describe the general chemical properties of catalysts		Understand and be able to explain the general chemical properties of catalysts		Unable to understand and explain the general chemical properties of catalysts
Achievement 2	Understand and be able to accurately describe organometallic complexes		Understand and be able to explain about organometallic complexes		Unable to understand and explain about organometallic complexes
Achievement 3	Understand industrial catalytic reactions and be able to explain them accurately with specific examples		Understand industrial catalytic reactions and be able to explain them with specific examples		Unable to understand industrial catalytic reactions and unable to explain with specific examples
Assigned Department Objectives					
学習・教育到達度目標 ④ JABEE (A) JABEE (d-1) JABEE (g)					
Teaching Method					
Outline	1. Catalytic Chemistry focuses on organometallic catalysis, and introduces the fundamentals of organometallic chemistry as compactly as possible. 2. This course is a study-credit course, so students will be required to write a report before and after the course.				
Style	Achievements 1-3: Students will be evaluated based on a score of 60% or higher in the quiz, midterm, and regular examinations. Students will be required to make a presentation on their assignments.				
Notice	1. A number of quizzes and reports, midterm and regular exams (quizzes and reports: 10%, regular: 80%) 2. presentations and discussions (10%) 3. Courses offered every other year (courses offered in 2022)				
Characteristics of Class / Division in Learning					
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input type="checkbox"/> Applicable to Remote Class <input type="checkbox"/> Instructor Professionally Experienced	
Course Plan					
			Theme	Goals	
2nd Semester	3rd Quarter	1st	--Outline of organometallic chemistry and organometallic complexes-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	To understand organometallic chemistry and organometallic complexes in general	
		2nd	--Synthesis, structure and name of the organometallic complexes-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Understand the synthesis, structure, and naming of organometallic complexes.	
		3rd	--Basic reactions of organo-transition metal complexes-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	To understand the basic reactions of organo-transition metal complexes	
		4th	--Industrial Catalytic Reactions: Reactions of Alkenes-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Industrial Catalytic Reactions: Understanding the reactions of alkenes	
		5th	--Industrial Catalytic Reactions: Carbon Monoxide Reaction-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Industrial catalytic reactions: Understanding the reaction of carbon monoxide	

		6th	--Industrial catalytic reactions: Reactions related to acetic acid production-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Industrial catalytic reactions: Understanding reactions related to acetic acid production
		7th	--Synthetic reactions using catalysts: Cross-coupling (Ni catalyst)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic reactions using catalysts: Understanding cross couplings (Ni catalyst)
		8th	--Synthetic Reactions Using Engineering Catalysts: Cross Coupling (Pd Catalyst) 1-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic reactions using engineering catalysts: Understanding cross couplings (Pd catalyst)
	4th Quarter	9th	--Synthetic Reactions Using Engineering Catalysts: Cross Coupling (Pd Catalyst) 2-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic reactions using engineering catalysts: Understand the details of cross coupling (Pd catalyst)
		10th	--Synthetic reactions using catalysts: Polymerization (Ti catalyst)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic reactions using catalysts: Understanding polymerization (Ti catalyst)
		11th	--Synthetic reactions using catalysts: Polymerization (Ni catalyst)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic reactions using catalysts: Understanding polymerization (Ni catalyst)
		12th	--Asymmetric catalytic reactions and complex catalysis (asymmetric hydrogenation)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Understand asymmetric catalytic reactions and complex catalysis (asymmetric hydrogenation)
		13th	--Asymmetric catalytic reactions and complex catalysis (cyclopropanation)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Understand asymmetric catalytic reactions and complex catalysis (cyclopropanation)
		14th	--Asymmetric catalysis and complex catalysis (asymmetric oxidation reactions)-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Asymmetric catalysis and complex catalysis (asymmetric oxidation reactions)
		15th	--Synthetic Reactions Using Catalysts: Introduction to the Nobel Prize in Chemistry-- Preparation: Understand the relevant part of the reference book. Review: Solve similar problems in the reference book.	Synthetic Reactions Using Catalysts: An Introduction to the Nobel Prize in Chemistry
		16th		

#### Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	80	10	0	10	0	0	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	80	10	0	10	0	0	100
Cross Area Proficiency	0	0	0	0	0	0	0