

Course Schedule Information

Course Code	88A508
Semester	Winter Term
Day and Period	Other
Course Name (Japanese)	国際交流特別講義 2（生物発想化学工学 2）
Course Name	International Exchange Special Lecture 2 (Bio-Inspired Chemical Engineering 2)
Capacity	0
Room	
Course Numbering Code	88INES9U105
Required/Optional	バーチャル留学プログラム科目 基_290852 (On-demand)
Type of Class	Lecture Subject, Seminar Subject
Credits	1.0
Student Year	1,2,3,4,5,6
Instructor	UMAKOSHI Hiroshi
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	Bio-Inspired Chemical Engineering	
Language of the Course	English	
Learning Methods	<p>Listening and watching face-to-face/online class: Listening and watching a lecture, video, or demonstration, face-to-face or via online (e.g., attending a face-to-face lecture, watching an on-demand video)</p> <p>Reading: Reading books and academic papers (e.g., summarizing an academic paper, reading information on a website)</p> <p>Discussion: Learning through question-and-answer interactions and exchanges of opinions among students and between students and the instructor (e.g., pair/group discussion, online chat, one-on-one guidance for writing an academic paper)</p> <p>Presentation: Writing papers, making presentations, and creating works (e.g., report writing, oral/poster presentation, creation of works, portfolio development)</p>	
Course Objectives	<p>The bio-system has a variety of efficient and potential functions to adapt itself to the given environment. In the "bio-system", an efficient and selective strategy to produce valuable materials has been employed by utilizing their self-organizing nature, while a strategy with higher consumption of materials and energy must be selected in the "artificial system" utilized in the conventional chemical/bio process. The most essential and important aspect in the "bio-system" is the use of "self-organizing system". In this lecture, review will be given on the new direction of chemical engineering, inspired by the bio-systems through the utilization of nature and function of the self-organizing system. This course includes the lectures for the basic and systematic information on the biofunctional materials design, the pair-work and/or discussion for the creation of new idea to develop their faculty.</p>	
Learning Goals	1	<p>At the end of this lecture, students will be able to</p> <ul style="list-style-type: none"> - Explain the basic characteristics of bio-elemental materials and (model) biomembrane. - Contrast the conventional bioseparation using phase-separating system and "bio-

	<p>inspired" separation utilizing self-organizing system, focusing on their characteristics</p> <ul style="list-style-type: none"> - Understand the cutting-edge of the conventional and next materials design - Understand the basic concept and strategy of B-ICE for next chemical engineering from both microscopic and macroscopic viewpoints. - Classify the basic and systematic information of B-ICE through the Lectures - Explain the basic concept of B-ICE based on the Individual Case Study - Display their Comment based on the basic skills on discussion / communication in General Discussion 																																			
Requirements, Prerequisites	Attendance, Presentation and Proposal																																			
Attendance and Student Conduct Policy	Please contact the Graduate Students Section or the professor/instructor in charge when you will not be able to attend lectures due to infectious disease originating at the university, fever or bereavement when losing a loved one.																																			
Class Plan	<table> <tr> <td rowspan="4">1st</td><td>Title:Overview</td></tr> <tr> <td>Overview of Bio-Inspired Chemical Engineering</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">2nd</td><td>Title:Fundamentals</td></tr> <tr> <td>Basic Information of Amphiphilic Biomolecules and Their Self-Assemblies</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">3rd</td><td>Title:Basic Science in "Bio-Inspired Chemical Engineering" (1)</td></tr> <tr> <td>Physicochemical Properties of Systems</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">4th</td><td>Title:Basic Science in "Bio-Inspired Chemical Engineering" (1)</td></tr> <tr> <td>Physicochemical Properties of Targets</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">5th</td><td>Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (1)</td></tr> <tr> <td>Bioseparation</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">6th</td><td>Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (2)</td></tr> <tr> <td>Bioanalysis</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> <tr> <td rowspan="4">7th</td><td>Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (3)</td></tr> <tr> <td>Medical Application</td></tr> <tr> <td>Instructor :</td></tr> <tr> <td>Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.</td></tr> </table>	1st	Title:Overview	Overview of Bio-Inspired Chemical Engineering	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	2nd	Title:Fundamentals	Basic Information of Amphiphilic Biomolecules and Their Self-Assemblies	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	3rd	Title:Basic Science in "Bio-Inspired Chemical Engineering" (1)	Physicochemical Properties of Systems	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	4th	Title:Basic Science in "Bio-Inspired Chemical Engineering" (1)	Physicochemical Properties of Targets	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	5th	Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (1)	Bioseparation	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	6th	Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (2)	Bioanalysis	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.	7th	Title:Cutting Edge of "Bio-Inspired Chemical Engineering" (3)	Medical Application	Instructor :	Independent Study Outside of Class : Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.
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Textbooks	Some references will be supplied in each lecture.																																			
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Grading Policy *Hover the mouse over the number of a learning goal to view the full text of it.	Evaluation Methods	Self-Feedback	Mini-Report	Report/paper		
	Learning Goals1	○	○	○		
	Allocation of Marks	50%	25%	25%		
Additional Information on Grading	50% Self-Feedback, 25% Mini Report (Concept Mapping/Contrast), 25% Final Report (Research Proposal)					
Reasonable Accommodation	<ul style="list-style-type: none"> • If you need reasonable accommodation to participate in this class due to disability (including intractable disease and chronic condition), please contact the office for students with disabilities (e.g., Educational Affairs Section, Academic Affairs Section, Student Affairs Section) at your school/faculty or graduate school, or the Disability Advisory and Support Service Office of the Health and Counseling Center. • For more information, please visit the following website or contact the Disability Advisory and Support Service Office of the Health and Counseling Center. Website : https://acs.hacc.osaka-u.ac.jp Tel : 06-6850-6107 E-mail : campuslifekenkou-ac@office.osaka-u.ac.jp 					
Special Note	<p>This lecture is one of lecture series on "Bio-Inspired Chemical Engineering". Bio-inspired Chemical Engineering 1 will focus on Conventional Bio-Chemical Engineering (Bioseparation) and Bio-Inspired Chemical Engineering 2 will focus on cutting-edge of Bio-Inspired Chemical Engineering.</p> <p>Student can download "Course Outline" of B-ICE1 and B-ICE2 on the following web. https://1drv.ms/u/s!AsJWITSxR11shoNSM5U6-zf2dHoE6Q?e=VyAsGy</p> <p>When students with disabilities take this course and request reasonable accommodation, please contact the Graduate Students Section or the instructor in advance and discuss the concerns.</p>					
Office Hours	16:00-17:00, Friday C329 Umakoshi 16:20-17:50, Friday C335 Okamoto					
Course Conducted by Instructors with Practical Experience						

Instructor(s)

Instructor Name	Name (hiragana)	Affiliation, Title, Course	Office	Extension	E-mail
Hiroshi Umakoshi			C329	6287	umakoshi.hiroshi.es@osaka-u.ac.jp
Yukihiro Okamoto			C335	6288	okamoto.yukihiro.es@osaka-u.ac.jp
Nozomi Watanabe			C-331	6285	no.watanabe.es@osaka-u.ac.jp

Cautions for Students