

<<Last Updated:2022/02/24>>

## Course Schedule Information

Course Code	88A054
Semester	Fall Term
Day and Period	Fri1
Course Name (Japanese)	国際交流特別講義 2 (生物発想化学工学 1)
Room	
Course Name	International Exchange Special Lecture 1(Bio-Inspired Chemical Engineering 1)
Capacity	0
Course Numbering Code	88INES9U105
Required/Optional	バーチャル留学用
Credits	1.0
Student Year	1,2,3,4,5,6
Field	
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 Name	
Language of the Course	English
Type of Class	Lecture Subject
Course Objective	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.
Learning Goals	At the end of this lecture, students will be able to - Explain the basic characteristics of bio-elemental materials and (model) biomembrane. - Contrast the conventional bioseparation using phase-separating system and "bio-inspired" separation utilizing self-organizing system, focusing on their characteristics - 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
Requirement / Prerequisite	Attendance, Presentation and Proposal
Class Plan	[1] Guidance (Bio-Chemical Engineering and Bio-Inspired Chemical Engineering, Overview of Bioseparation

	[2] Basic Information of Biomaterials [3] Up-stream Process (1) (Cell Disruption, Filtration, Centrifugation) [4] Up-stream Process (2) (Cell Disruption, Filtration, Centrifugation) [5] Down-stream Process (1) (Extraction, Precipitation, Chromatography) [6] Down-stream Process (2) (Extraction, Precipitation, Chromatography) [7] Down-stream Process (3) (Extraction, Precipitation, Chromatography) [8] Examination and Wrapping-Up
<b>Independent Study Outside of Class</b>	Reference will be introduced in each lecture. Students should better to read the reference before and after each lecture.
<b>Textbooks</b>	Some references will be supplied in each lecture.
<b>Reference</b>	Reference will be introduced in each lecture.
<b>Grading Policy</b>	60% Mini-report, 40% Examination
<b>Other Remarks</b>	Be proud of yourself as a Chemical Engineering Scientist. The students should learn how to elucidate the fusion of the different concepts or researches through the case study of his/her individual research field. The lecture on the communication skills will also be given for the completion of their individual concept mapping.
<b>Special Note</b>	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.  Student can download "Course Outline" of B-ICE1 and B-ICE2 on the following web. <a href="https://1drv.ms/u/s!AsJWITSxR11shoNSM5U6-zf2dHoE6Q?e=VyAsGy">https://1drv.ms/u/s!AsJWITSxR11shoNSM5U6-zf2dHoE6Q?e=VyAsGy</a>  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.
<b>Office Hour</b>	16:00-17:00, Friday C329 Umakoshi 16:20-17:50, Friday C335 Okamoto
<b>Keywords</b>	Bio-Inspired, Self-assembly, Bioseparation, Biochemical Engineering, Analytical Chemistry
<b>Messages to Prospective Students</b>	Students should begin to think of what's next in chemical engineering.  You can check the "COURSE OUTLINE" of B-ICE2020. <a href="https://1drv.ms/u/s!AsJWITSxR11shLRgQ1RFb82P7nLwNQ?e=M079ut">https://1drv.ms/u/s!AsJWITSxR11shLRgQ1RFb82P7nLwNQ?e=M079ut</a>

## Instructor(s)

Instructor Name	Name (hiragana)	Affiliation, Title, Course	Office	Extension	Fax	E-mail
Hiroshi Umakoshi			C329	6287		umakoshi@cheng.es.osaka-u.ac.jp
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## Cautions for Students

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