

Introduction to Chemical Engineering Science :

Basic and Bio-Inspired Approach

("on-demand" Style Lecture)

Persons in charge (Instructors):

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Intended participants:

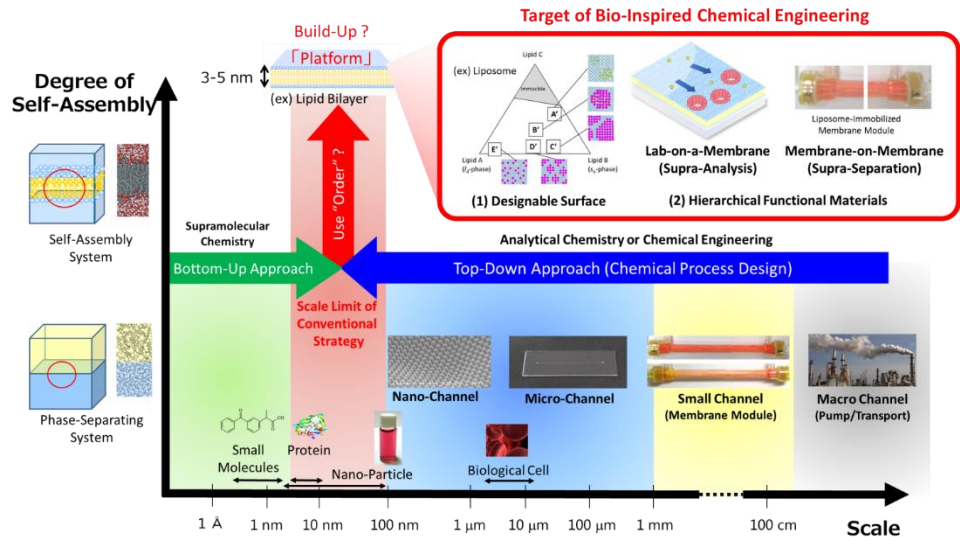
Students of Virtual Study
Abroad Program

Lecture credits: 1

Opening time: Winter Term
from December,

Purpose of lecture:

The basics of chemical engineering are introduced. By employing chemical process as a case study, students will understand a conventional strategy on "Chemical Engineering": (i) Mass Balance (Unit Operations), (ii) Physico-Chemical Approach (Transport Phenomena / Equilibrium), (iii) Process Design. At the final stage, students will learn (iv) a new strategy utilizing self-organizing system, called as "Bio-Inspired Chemical Engineering".



Contents of lecture:

- (1) **Background:** What's **Chemical Engineering** and **Chemical Engineering Science** ?
- (2) **Scientist's Approach** (1) : Transport Phenomena (Analogy of Heat / Mass Transport)
- (3) **Scientist's Approach** (2) : Phase Equilibrium (Raoult's Law and Henry Law)
- (4) **Engineer's Approach** (1) :
Let's Design Chemical Process : Mass Balance for Unit Operations (Chemical Process Flow)
- (5) **Engineer's Approach** (2) : Let's Design Chemical Process [1] Design of Distillation
- (6) **Engineer's Approach** (3) : Let's Design Chemical Process [2] Design of Heat Exchanger / Absorption
- (7) **Engineering Scientist's Approach** : Cutting-edge for NEXT Chemical Process
~**Bio-Inspired Chemical Engineering Science**~
- (8) **Small Examination** (on CLE)

Text and Reference books: Relating documents will be supplied in each lecture.

Outcomes:

- At the end of this lecture, students will be able to
- **understand** the basic and conventional strategy of Chemical Engineering
 - **contrast** the above strategy and a new strategy with "Bio-Inspired" approach
 - **imagine** how they could pioneer a new philosophy of their own

Outputs (as the Students Duties):

- (1) Self-Feedback in CLE (What you understand, What you cannot understand, Others) (**every lecture**) (55%)
- (2) Small Examination in CLE (45%)

Grading: **Pass** or **Fail**

Remarks and comments:

All the lectures will be given "on-demand" by using Osaka University CLE. So, students will be able to join to this course at any time during the "Autumn" term (in OU academic calendar). However, students will have to pay their attentions to "Deadline". All of them would be automatically closed after the deadline.

Please enjoy "Cutting-Edge" on "Bio-Inspired Chemical Engineering", but unfortunately only at the final lecture (Lecture (7)). If students would be interested in such fields, they could have chance to register other courses (**Bio-Inspired Chemical Engineering 1**(Winter) and **B-ICE 2**(Winter) **only for graduate students**).