

Elective Course Description (2. Spring Semester)

Subject (English)	Chemical and Biomolecular Engineering II	Semester	Spring	Day/Slot	
科目名 (日本語)	化学・バイオ工学Ⅱ				
Course Code		Course Numbering	TCH-BIO305	Period	Apr. – Aug.
Instructor (Post)	Prof. Hitoshi Shiku			Campus	
				Building	
Faculty	Department of Applied Chemistry, Chemical Engineering and Biomolecular Engineering	Credits	2	Class Room	
Class subject	-				
Object and summary of class	<p>Biomolecular engineering refers to any technological applications of chemical and biological systems, such as biomolecules and environmental materials to make or modify products or green processes for specific purposes. This class focuses on biomaterials, biomedical engineering, metabolic engineering, glycochemistry, environmentally benign materials and reactions, green process and life cycle assessment. Students will learn some basic aspects of engineering for biotechnology, biological and environmental materials.</p>				
Keywords	-				
Goal of study	-				
Contents and progress schedule of class	<ol style="list-style-type: none"> 1. Biomaterials and cell culture (by Prof. Hitoshi Shiku) <ol style="list-style-type: none"> 1-1. Cell culture and embryology 1-2. Tissue engineering and biomaterials 2. Biomedical engineering and Biosensors (by Prof. Tomokazu MATSUE) <ol style="list-style-type: none"> 2-1. Basics of Bioelectrochemistry 2-2. Biosensor technology 3. Plant specialized metabolites (by Associate Prof. Seiji TAKAHASHI) <ol style="list-style-type: none"> 3-1. Basic sciences and histories of use 3-2. Metabolic engineering for production of valuable metabolites 4. Carbohydrate chemistry (by Associate Prof. Masato NOGUCHI) <ol style="list-style-type: none"> 4-1. Principles of carbohydrate chemistry 4-2. Chemical glycosylation reaction 5. Transformation of biomass molecules in green solvents (Associate Prof. Masaru WATANABE) <ol style="list-style-type: none"> 5-1. Hydrothermal water process 5-2. Ionic liquid-based green solvents 6. Chemical Systems Engineering (by Prof. Yasuhiro FUKUSHIMA) <ol style="list-style-type: none"> 6-1. Basics in evaluating sustainability aspects of process technologies 6-2. A case study on integrated biological, agricultural and chemical process systems design 7. Development of environmentally benign materials and reactions (by Associate Prof. Naoya MOROHASHI) <ol style="list-style-type: none"> 7-1. Host-guest chemistry and separation materials using host molecules 7-2. Development of carboxylation reactions with carbon dioxide 				
Preparation	Knowledge of organic chemistry and biochemistry will be required.				
Record and evaluation method	Students will be evaluated based on: class attendance, examinations and/or reports depending on topics. No make-up exam.				
Textbook and references	-				
Self study	-				
In addition	-				