Course Numbering	TCH-MAC303J
Year	First semester 2025
Subject (J)	Chemical and Biomolecular Engineering I
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Credit(s)	2Credits
Instructor	SHUICHI OI,PICHIERRI FABIO,MASAKI KUBO,YUTAKA FUJIMOTO,SHOGO KUMAGAI,YOSHINAO NAKAGAWA,SHINGO MARUYAMA
Media Class Subjects	○
Essential Subjects	○
Language of Instruction	
Course Objectives and Summary/ Learning Goals (J)	Google Classroomのクラスコードは工学部Webページにて確認すること。 学部シラバス・時間割(https://www.eng.tohoku.ac.jp/edu/syllabus-ug.html) Purpose/Abstract We are surrounded by a large number of chemical products manufactured with various types of materials including organic, inorganic and their composite materials. Even in our body, biological materials are constantly being produced with the help of specialized enzymes and biochemical reactions. The objective of the present course is to provide chemistry-oriented topics concerned with the development of functional materials in various areas of engineering. Goal Students will learn some basic aspects of chemical production, with special emphasis on environmentally friendly methodologies for the synthesis of fine chemicals and advanced materials. Contents This course is offered in the Spring semester with the goal of understanding chemical and biomolecular engineering. Various topics will be presented by different instructors, as listed in the course schedule below, with each instructor giving two lectures for each topic.
Course Objectives and Summary/ Learning Goals	The class code for Google Classroom can be found on the Web site of the School of Engineering: https://www.eng.tohoku.ac.jp/edu/syllabus-ug.html (JP Only) Purpose/Abstract We are surrounded by a large number of chemical products manufactured with various types of materials including organic, inorganic and their composite materials. Even in our body, biological materials are constantly being produced with the help of specialized enzymes and biochemical reactions. The objective of the present course is to provide chemistry-oriented topics concerned with the development of functional materials in various areas of engineering. Goal Students will learn some basic aspects of chemical production, with special emphasis on environmentally friendly methodologies for the synthesis of fine chemicals and advanced materials. Contents This course is offered in the Spring semester with the goal of understanding chemical and biomolecular engineering. Various topics will be presented by different instructors, as listed in the course schedule below, with each instructor giving two lectures for each topic.
Relevance to Other Subjects/Considerations for Taking the Class (J)	It would be desirable that the students attending this class have wide knowledge of fundamental chemistry at the undergraduate course level.
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Course Description (J)	1. Chemistry of carbon nanomaterials by Assoc. Prof. Fabio PICHIERRI 1-1. Structure and bonding in organic molecules 1-2. Fullerenes, carbon nanotubes and graphene 2. Particle dynamics in nanofluids by Prof. Masaki KUBO 2-1. Aggregation / dispersion of particles 2-2. Aggregation kinetics and colloidal dynamics 3. Catalytic production of chemicals from biomass by Assoc. Prof. Yoshinao NAKAGAWA 3-1. Production of pure platform chemicals from biomass 3-2. Conversions of biomass-derived platform chemicals

	4. Feedstock Recycling of Waste Plastics by Assoc. Prof. Shogo KUMAGAI 4-1. Latest Trends and Challenges in Plastic Recycling 4-2. Technologies for Chemical Feedstock Recovery from Plastics 5. Fine synthetic organic chemistry using metallic reagents by Prof. Shuichi OI 5-1. Synthetic methodologies using metallic reagent 5-2. Synthesis of luminescent materials 6. Phosphors for radiation detectors by Assoc. Prof. Yutaka FUJIMOTO 6-1. Ionizing radiation induced luminescence 6-2. Inorganic scintillators and their applications 7. Science and technology of thin films by Assoc. Prof. Shingo MARUYAMA 7-1. Fundamental aspects and practical applications of thin films 7-2. Fabrication techniques of thin films
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Preparation and Review(J)	ノートや配布資料を復習し、理解を深める。
Preparation and Review	To deepen understanding after each class, review and summarize the content of learning looking back at one's own notes, the handout or prints that were delivered by each instructor.
Evaluation methods and criteria (J)	レポート、課題、授業で実施する小テスト等により学修目標への達成度を総合的に評価する。
Evaluation methods and criteria	Evaluation is performed comprehensively based on reports, homework, short tests etc.

Textbooks and references

Title	Author	Publisher	Year	ISBN/ISSN	Classification

URL	
Attached File	

Office Hours(J)	After each lecture in the class room, otherwise any time at his/her office but an appointment should be made in advance.
Office Hours	
Contact： Please insert '@' in the email address.	クラスルームで連絡可能
Notes	The handout and/or prints will be delivered by each instructor in his/her class.
Practical Skill/Hands-on Class	
Other Comments/Instructions	
Last Update	2024/02/07 15:56:14

One-credit courses require 45 hours of study. In lecture and exercise-based classes, one credit consists of 15-30 hours of class time and 30-15 hours of preparation and review outside of class. In laboratory, practical skill classes, one credit consists of 30-45 hours of class time and 15-0 hours of preparation and review outside of class.