

Introduction to "Chemical Engineering"



“‘Chemical Engineering’ is what we need for mono-zukuri (making of material objects).”

Knowledge of chemical engineering is essential to produce things that are essential to modern society. Chemical engineering, which supports mono-zukuri around the world, contributes to the development of a wide variety of fields beyond the framework of chemical, including global environment, resources, energy, medicine, and biotechnology.

“For those with a driving interest in learning about chemical engineering”

Chemical engineering is a discipline that systematizes the methodology for learning the basics not only of chemistry but also physics and biology to create new science and technology based on chemistry, and promote mono-zukuri to produce things that are useful in our daily life and society.

Chemical engineering is a discipline that is necessary in order to develop an entire manufacturing system to manufacture products from materials on an industrial scale by considering a process that is safe, environmentally-friendly and efficient, and by comprehensively taking into account the impact of products and wastes on the environment, how to secure resources and energy, and the establishment of a recycling-oriented society. Because of this nature of the discipline, chemical engineering has become important not only in the chemical industry but also in other industries, such as food,

pharmaceutical, electronics, metals and automobiles, as well as energy industries, such as petroleum refining, electricity and gas. More recently, chemical engineering has been contributing to society, such as in developing new materials and ingredients, addressing challenging issues of life science, developing new resources and energies, and solving global environmental issues.

Researchers and engineers in chemical engineering deal with all processes and systems associated with chemical reactions with emphasis on the balance between substances and energies. They are engaged in the development of advanced chemical synthesizing technology, synthesizing systems for new substances and new materials using nanotechnology and biotechnology and their production systems, environmentally-friendly new energy systems, and innovative resource circulation systems for a recycling-oriented society.

Education and research in our department focus on training specialists who have not only expertise in a specific field but also all-round competence to be able to overview the entire targeted chemical system and rationally design and assess it from a global perspective. Alumni of our department are playing an important role in a wide range of industrial fields.

Education Courses

Undergraduate

Introduction to Chemical Engineering	Diffusional Separation Engineering I	Special Topics: Chemical Engineering I
Introduction to Physical Chemistry	Diffusional Separation Engineering II	Special Topics: Chemical Engineering II
Laboratory: Chemical Engineering I	Chemical Reaction Engineering I	Mathematics for Chemical Engineering
Laboratory: Chemical Engineering II	Chemical Reaction Engineering II	Exercises: Chemical Engineering I
Undergraduate Project in Chemical Engineering	Biochemical Engineering	Exercises: Chemical Engineering II
Chemical Engineering Practice	Powder Technology I	English Reading for Chemical Engineers
Chemical Engineering Stoichiometry	Powder Technology II	Analytical Chemistry B
Transport Phenomena I	Process Control Engineering	Physical Chemistry IIB
Transport Phenomena II	Process Systems Engineering	Organic Chemistry
Transport Phenomena III	Process Equipment Design	
Chemical Engineering Thermodynamics	Process Design	

Graduate

Advanced Seminar in Materials Science and Engineering	Advanced Materials Process Engineering	Advanced Environmental Communication
Special Project in Materials Science and Engineering	Advanced Chemical Engineering	Field Work on International Environmental Activities
Advanced Particle Science and Technology	Advanced Science and Engineering of Material Cycling	Technology-based-Entrepreneurship Course
Advanced Chemical Reaction Engineering	Advanced Science and Engineering of Energy Cycling	Nanoscience and Nanotechnology
Advanced Chemical Engineering Fluid Mechanics	Advanced Resource Engineering	
Advanced Process System Engineering	Advanced Internship in Chemical Engineering	
Advanced Separation Science and Engineering	Advanced Chemical Engineering and Process Technology	
	Advanced Studies on International Environmental Issues	

Carrier of Alumni

Graduate course; National government; Local government; Academia
[Chemical] Mitsubishi Chemical; Sumitomo Chemical; Toray; Asahi Kasei; Mitsui Chemicals; Shin-Etsu Chemical; AGC; Sekisui Chemical
[Pharmaceutical] Takeda Pharmaceutical; Astellas Pharma; Daiichi-Sankyo; Eisai; Otsuka Pharmaceutical; Shionogi;
[Energy and Plant engineering] JGC; Chiyoda; Toyo engineering; Kawasaki heavy industries; Kajima; Kobelco; Kansai electric power; Osaka gas;
[Food] Suntory; Ajinomoto; Meiji; Asahi Breweries
[Consumer products] Kao; Shiseido
[Electronics] Toppan; Panasonic; Daikin; Kyocera; Murata
[Automobile] Toyota; Honda; Nissan; Denso
[Others] A.T. Kearney; Japan patent office; AIST