

Education Policy of the Department of International Development Engineering [Bachelor's Program]

What is International Development Engineering?

International development engineering is an interdisciplinary field of engineering that takes in the fields of economics, political science, environment, and social science, in addition to engineering-related fields. By integrating a wide range of knowledge related to international development in addition to the expertise in the existing engineering fields, it strives to use science and technology while considering sustainable development in order to solve a variety of globally-affecting issues that cannot be dealt by an individual country or region.

Objective of Human Resource Development

The Department of International Development Engineering aims to cultivate students' basic academic skills in international development engineering, a discipline that strives to use science and technology while considering sustainable development in order to solve a variety of globally-affecting issues in an internationalized society. In addition, the department aims to develop global engineers who, with basic competencies related to international development engineering such as problem solving skills and international communication skills, are highly promising to become internationally successful.

Ability and Aptitude Desired in Candidates

The department seeks individuals who have the following qualities:

- Solid basic academic skills in a wide range of disciplines centered on science and mathematics as well as the basic ability to explain one's own ideas logically and clearly
- With an interest in the issues faced by the international community or local community and an intention to solve those issues, have the motivation to study proactively

Skills Students Will Learn

In this department, students will acquire the following skills:

1. Ability to intrinsically understand the universal concepts of science and technology common in all engineering fields as well as engineering ethics gained through studying engineering basics
2. Basic technical skills in international development engineering as well as in chemical engineering, mechanical engineering, electrical and information engineering, and civil engineering
3. The foundations for comprehensive skills required to solve problems, including social science that go beyond the existing borders of academic disciplines
4. Communication skills as a technologist
5. An international mindset as a technologist who supports international cooperation
6. The foundations for practical skills gained through an international experience such as an international internship

Overview of the Education

The department offers an education with the following characteristics in order to allow students to master the above-mentioned skills:

- A) Learn technical skills in international development engineering (the skill to master I):
Promote an understanding of tools and methodologies for solving problems and develop the ability to define problems through developing specialized core academic skills in international development engineering and offering hands-on education involving practices and exercises.
- B) Learn specialized academic skills in a wide range of fields related to international development engineering (the skill to master II)
Develop specialized academic skills in a wide range of fields (e.g., chemical engineering, mechanical engineering, electrical and information engineering, civil engineering, economics, etc.) rather than in one specialized field.
- C) Develop the ability to independently define and solve problems (the skill to master III)
Strive to develop and improve practical problem-solving skills in order to solve problems while considering the engineering ethics.
- D) Develop the ability to understand and systematize the latest trend in the research field (the skills to master I and IV)
Develop research capabilities to help systematize studies conducive to the development of a specialized field in addition to understanding the positioning and contribution of one's own studies as well as the latest research trend in the field.
- E) Develop practical international communication skills (the skill to master V)
Cultivate communication skills through the mixed educational environment in laboratories that includes both Japanese and foreign students. In addition, by conducting lectures in English, develop the ability to explain one's own specialized field logically and systematically in English.
- F) Develop practical skills for international cooperation (the skill to master VI)
Develop an understanding of an ideal international cooperation through the mixed educational environment in laboratories that includes both Japanese and foreign students as well as through the lectures based on real-life examples of international project implementation. Furthermore, develop practical skills for international cooperation through practical training such as an international internship.

Education Policy of the Department of International Development Engineering [Master's Program]

Objective of Human Resource Development

The master's program in the Department of International Development Engineering aims to develop expertise that can be applied to define and solve problems so that a variety of issues, including poverty and regional disparities in developing countries and global environmental destruction, that must be solved through international cooperation can be resolved using scientific and technological means. In addition, the program strives to develop global engineers who can become internationally successful with the type of communication and management skills that can be applied effectively in international cooperation in practice.

Ability and Aptitude Desired in Candidates

The department seeks individuals who have the following qualities:

- Interested in the issues faced by the international community or local community and motivated to obtain advanced knowledge in order to solve those issues
- Possess both the flexibility to try to study a wide range of related fields and the desire to master one's own area of specialty
- Possess solid basic academic skills required to master advanced international development engineering
- Possess the basic competency in international communication, management, and cooperation.

Candidate Selection Policy

In order to select individuals who possess the above qualities and abilities, the department conducts a written exam on basic knowledge of international development, mathematics, physics, and chemistry (it mainly includes basic knowledge on international development, calculus, linear algebras, probability and statistics, mechanics, electricity and magnetism, and thermodynamics) and an oral exam related to research capability and aptitude in addition to the evaluation of English skills. Furthermore, screening will be conducted based on the GPA through the junior year in undergraduate program, the score of the English Department test, and an oral examination.

Skills Students Will Learn

In this program, students will acquire the following skills:

- I. Ability to define problems through enhanced specialized academic skills (the skill mastered in undergraduate 2)
- II. Ability to think logically based on a wide range of specialized academic skills (the skills mastered in undergraduate 2 and 3)
- III. Practical problem-solving skills to ethically conduct creative research and technology development (the skills mastered in undergraduate 1 and 3)
- IV. Ability to understand and systematize the latest trend in the research field (the skill mastered in undergraduate 2)

- V. Communication skills necessary for international success (the skills mastered in undergraduate 4 and 5)
- VI. Practical skills of international cooperation to support the execution of international projects (the skill mastered in undergraduate 6)

Overview of the Education

The department offers an education with the following characteristics in order to allow students to master the above-mentioned skills:

- A) Education for the students to understand the overall picture of engineering (the skill to master 1)
Conduct education that combines lectures, exercises, and experiments so that students can have an overall understanding of the key engineering concepts such as mathematics, mechanics, electromagnetics, thermodynamics, fluid mechanics, physical chemistry, and system engineering.
- B) Education for the students to master problem-solving skills that are not bound by the existing notion of the discipline (the skills to master 2 and 3)
Conduct education that combines lectures and exercises in order to allow students to master what is necessary to solve problems, including skills to analyze materials, measure physical quantities, qualitatively and quantitatively analyze information, plan, and design, as well as knowledge of social science.
- C) Education for the students to acquire a global mindset and management skills as a technologist (the skills to master 3 and 5)
Conduct education through lectures that emphasize key engineering concepts, problem-solving skills, communication skills, and other related matters in order to allow students to acquire a global mindset and project management skills from the standpoint of a technologist, rather than merely as a social norm.
- D) Education for the students to develop superior communication skills as a technologist (the skills to master 4 and 5)
Conduct education that combines lectures and exercises in order to allow students to develop skills for smooth communication that technologists require to be successful in the international and local communities.
- E) Education in a mixed environment including both Japanese and foreign students (the skill to master 5)
Conduct education in a mixed environment by setting the same admission quota for Japanese and foreign students in order to offer daily learning experience in an international setting and naturally improve one's global mindset.
- F) Education for the student to develop practical skills necessary as global engineers (the skills to master 5 and 6)
Conduct education in which students attempt to work on specific issues through internship, field work, and graduation research, in order to develop superior practical skills as a compilation of the education A) through E) to be applied in an international setting.

Education Policy of the Department of International Development Engineering [Doctoral Program]

Objective of Human Resource Development

In the doctoral program in the Department of International Development Engineering, students aim to become highly-skilled experts who take leadership in the field of international development engineering in order to use scientific and technological means to solve a variety of issues, such as poverty and regional disparities in developing countries and global environmental destruction that must be solved through international cooperation. In addition, the program strives to develop global engineers who can demonstrate international leadership skills in identifying, defining, and solving problems under international cooperation.

Ability and Aptitude Desired in Candidates

The department seeks individuals who have the following qualities:

- Possess a wide range of specialized academic skills required to solve global issues and practical problem-solving skills built on those skills.
- Capable of applying the acquired expertise in a flexible manner by adding new insights.
- Possess a solid foundation for international communication and cooperation skills.
- Possess high aspirations as well as a strong will to proactively pioneer the knowledge.

Candidate Selection Policy

In order to select individuals who possess the above qualities and abilities, the department conducts an oral exam related to international development expertise, research and education competencies, and aptitude in addition to the evaluation of English skills.

Skills Students Will Learn

In this program, students will acquire the following skills:

- (1) Ability to demonstrate the leadership skills in an international framework
- (2) Ability to create and communicate new insights based on a wide range of systemized deep knowledge from a global perspective
- (3) Ability to recognize the essence and universality of matters and identify and explore new challenges
- (4) Ability to lead in the knowledge frontier based on deep insights and ethics
- (5) Ability to manage a wide range of knowledge in fields such as humanities and social sciences by recognizing their interconnectivity and building upon the field of science and engineering

Overview of the Education

The department offers the following education in order for the students to master the above-mentioned skills:

- A) Advanced technical knowledge and a wide range of expertise in science and engineering (the skills to master (2) and (3))

Develop the ability to understand the multi-layered academic elements in the field of international development engineering and its connection to each supporting specialized field

- B) Ability to lead within the interdisciplinary area (the skills to master (2) and (3))

Develop intuitions and abilities to examine the originality of researches, master languages, and give extensive presentations in international settings, as well as to understand the international research trend.

- C) Doctoral dissertation research (the skills to master (2) and (4))

In order for the students to become capable of developing their own world-class research, the program requires doctoral dissertation research. The students will master practical methodologies to identify, define, and solve issues through discussions with the instructor and mentor.

- D) Onsite research project (the skills to master (1) and (5))

The students will complete an onsite research project conducted at an organization such as domestic and international companies and research institution in order to master methods to logically develop an argument not only in Japanese but also in languages other than Japanese, such as English, and further develop leadership skills.