

Appended Form 1

Specifications for Major Program

Name of School (Program) School of Engineering, Cluster 4 (Social and Environmental Engineering)

| | |
|----------------------------|--|
| Program name (Japanese) | |
| (English) | Program of Civil and Environmental Engineering |

1. Academic degree to be Acquired

2. Overview

(1) -

This program aims to foster and produce future members of a global society who have the knowledge to be innovative, creative, take leadership, and possess language abilities that will help them play an important role in the international world.

This program focuses specifically on producing individuals who are capable of addressing various global issues from an engineering perspective and contribute to the creation of new and valuable solutions that are significant to both the industrial and academic societies.

Students enrolled in the program will begin the curriculum from the first semester of their first year. In the second year, students will set off on their major programs and take the designated courses which are offered at each cluster. Major program overview is as (2).

Program of Civil and Environmental Engineering

In this program, students learn the engineering theory needed to plan, design, construct, and maintain social infrastructure facilities that create rich communities and social environments, while attempting to harmonize and coexist with natural environments. Students also learn about a wide range of technology for environmental preservation on a global basis, considering that there is a strong demand for technologies that can create advanced, circulatory society that makes effective use of limited resources. Therefore, this program produces professionals and future engineers or researchers who take the initiative in addressing various technical problems, whether global or local, environment. This program produces professionals and future engineers or researchers who set goals on their own initiative, explore solution to problems in a scientific and rational way, and possess the leadership and vitality to achieve their goal in an ethical and harmonious way.

3. Academic Awards Policy (Policy for awarding degrees and goal of the program)

The Program of Civil and Environmental Engineering aims at developing engineers and researchers who are able, at their own discretion, to deal with the various problems faced when engaged in social infrastructure improvement in a comprehensive manner.

engineering to students who have acquired the number of credits necessary to meet the standard of the course and who, through learning the engineering theory needed to plan, design, construct, and maintain social infrastructure facilities, have acquired the liberal arts education and special education designed to achieve the following goals.

(A) A wide range of general knowledge and a broad perspective: The ability to view the expanding and increasingly complex societies and natural environments from multiple scientific perspectives of nature, humanities, and society

(B) The ability to identify issues: the ability to understand the relationship between nature, humankind, and technology, in both international and regional communities, a 10m

(E) The ability to evaluate: The ability to propose multiple solutions, predict outcomes, and evaluate relative merits

(F) Communication abilities: The ability to communicate to others the details of the proposed solutions, their rationale, their effects, and their feasibility

(G) Implementation and problem-solving abilities: The ability to implement problem-solving processes in cooperation with other people, by making full use of a wide range of general knowledge and a broad perspective, as well as the ability to identify problems, the ability to configure problems, the ability to analyze problems, comprehensive communication abilities, and the ability to enhance problem-solving abilities voluntarily and continuously by learning the above processes,

4. Curriculum Policy

The abilities required to achieve the seven goals (a wide range of general knowledge and a broad perspective, the ability to identify issues, the ability to configure problems, the ability to analyze problems, the ability to evaluate, communication abilities, and implementation and problem-solving abilities) are described below. The curriculum is organized in such a way that these abilities may be cultivated as required by engineers in civil and environmental engineering. Learning outcomes are evaluated based on the grade calculation for each subject and the level of attainment against the goals.

(A) Wide range of general knowledge and broad perspective

Required abilities: the ability to view the expanding and increasingly complex societies and natural environments from multiple scientific perspectives, such as nature, humanities, and society

The ability to explain the current status of the natural environment and expected environmental problems

The ability to give examples where different scientific findings on the same subject conflict

The ability to list multiple scientific facts relevant to the resolution of research tasks

Applicable subjects: liberal arts education subjects, Graduation Thesis

(B) Ability to identify issues

Required abilities: the ability to understand the relationship between nature, humankind, and technology in the international and regional communities, and the ability to identify issues

The ability to understand the characteristics of civil engineering structures and the surrounding environment, and to list possible natural phenomena and disasters

The ability to explain the roles that civil engineering has played in coexistence with the environment

The ability to position the existing technology related to research tasks, and to set goals

Applicable subjects: liberal arts education subjects, specialized basic

(C) Ability to configure problems

Required abilities: the ability to organize problems logically and construct technical issues

The ability to use knowledge about mathematics and physics, and select equation systems that control major elements of phenomena

The ability to mathematically express and understand diverse phenomena, including disasters

The ability to accurately explain the major elements constituting phenomena which are the subject of study

Applicable subjects: specialized basic

specialized

(D) Ability to analyze problems:

Required abilities: the ability to gather the necessary data and abstract, model, and analyze technical issues

The ability to acquire information necessary to model phenomenon

The ability to seek solutions for the model using mathematical methods

The ability to explain the validity and reliability of analytical approach in research

Applicable subjects: Liberal arts education

specialized basic

specialized

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(E) Ability to evaluate:

Required abilities: the ability to propose multiple solutions, predict outcomes, and evaluate relative merits

The ability to consider the applicability to actual phenomena of theoretically-gained solutions, and their limitations

The ability to design multiple alternative solutions, predict outcomes, and compare

The ability to explain knowledge gained from research and its applicability, and the limitations and social significance of civil engineering technology

Applicable subjects: specialized

(F) Communicating abilities

Required abilities: The ability to communicate to others details of proposed solutions, their rationale, their effects, and their feasibility

The ability to use information processing equipment, and prepare accurate charts, tables, and sentences with a certain level of quality

The ability

The basic ability to communicate in Japanese and English

Applicable subjects: Liberal arts education

specialized basic

specialized

(G) Implementation and problem-solving abilities:

Required abilities: the ability to implement problem-solving processes in cooperation with other people by making full use of (A) to (F) above. The ability to enhance problem-solving abilities voluntarily and continuously by learning the above processes.

The ability to evaluate problem-solving processes, and make suggestions for improvement

The ability to find knowle

Applicable subjects: specialized basic

and

, mainly specialized

5. Program Timing and Acceptance Conditions

The English-

. Enrollment

in Program of Civil and Environmental Engineering is the second year.

Those who are to be assigned to this program are chosen based on their requests and GPA.

6. Qualifications to be Acquired

This program is certified by the Japan Accreditation Board for Engineering Education (JABEE). Those who finish this program are certified as associate professional engineers, and exempt from the first examination for national certification as professional engineers. By completing the program, students are certified as assistant surveyors. Other relevant licenses are those for professional engineers, civil engineering works implementation management engineers, concrete engineers, senior concrete engineers, concrete diagnosis engineers, qualified engineers of the Society of Civil Engineers, operations chiefs of every kind, construction machine operation engineers, and real estate surveyors. By meeting all of the requirements, students can obtain these licentiates.

beral arts education subjects

(Japanese Constitution, etc.), students can obtain the Type-1 High School Teaching License (Industry).

7. Class Subjects and Course Content

* For class subjects, see the subject list in the attached sheet 1.

(subject list to be attached.)

* For course content, see the syllabus published every academic year.

* All courses are taught in Japanese. Course materials may be written in both Japanese and English or only English.

8 Academic Achievements

At the end of each semester, evaluation criteria are applied to each evaluation item of academic admission to the university until the current semester, is given as one of the following -converted values of their academic achievements (S = 4, A = 3, B = 2, and C= 1) in each subject being evaluated.

| Evaluation of academic achievement | Converted values |
|------------------------------------|------------------|
| S (Excellent: 90 points or higher) | 4 |
| A (Superior:80-89 points) | 3 |
| B (Good: 70-79 points) | 2 |
| C (Fair: 60-69 points) | 1 |

| Academic achievement | Evaluation criteria |
|----------------------|---------------------|
| Excellent | 3.00 4.00 |
| Very Good | 2.00 2.99 |
| Good | 1.00 1.99 |

* See the relationship between evaluation items and evaluation criteria in the attached sheet 2.

* See the relationship between evaluation items and class subjects in the attached sheet 3.

* See the curriculum map in the attached sheet 4.

9. Graduation Thesis (Graduation Research) (Purpose, when and how it is assigned, etc.)

Students who are admitted to the program must be as described in student handbook, who have met graduation requirements, and who have acquired a total of 46 credits in liberal arts education, a total of 79 credits in specialized education, and an overall total of 125 credits or more. This program also requires the students to write graduation thesis in English.

Students must select a supervisor in Civil and Environmental Engineering and to a supervisor. They select the subjects in their specialized field, apply their acquired knowledge and abilities, acquire new knowledge, enhance their problem-solving abilities voluntarily and continuously, and conduct their research. Thereby, the program aims at cultivating the abilities described below. Correspondence of these abilities to the learning and educational goals of Program of Civil and Environmental Engineering is also described.

1. Ability to identify issues: the ability to understand the relationship between nature, humankind, and technology in the international and regional communities, and to identify issues
2. Ability to configure problems: the ability to organize problems logically and construct technical issues
3. Ability to analyze problems: the ability to gather necessary data and to abstract, model, and analyze technical issues,
4. Ability to evaluate: the ability to propose multiple solutions, predict outcomes, and evaluate relative merits
5. Communication abilities: the ability to communicate to others details of proposed solutions, their rationale, their effects, and their feasibility
6. Implementation and problem-solving abilities: the ability to implement problem-solving processes in cooperation with other people by making full use of a wide range of general knowledge and a broad perspective, the ability to identify problems, the ability to construct problems, the ability to analyze problems, comprehensive communication abilities, and the ability to enhance problem-solving abilities voluntarily and continuously by learning the above processes

number of students for each educational subject is limited due to the requirement of providing sufficient guidance.

1. In mid-February of the third year, students attend the final meeting for graduation thesis presentations given by the fourth-year students in order to deepen their understanding of the subject of graduation theses.

attainment of learning and educational goals. This committee improves the educational system by undertaking staff development, by holding the external advisory committee, and by conducting questionnaires targeted at graduates. The committee also checks and improves the validity of the assessment and improvement system itself.

The examination working groups for each subject check and confirm the class plans and class implementation status, and ask the persons in charge of each subject to prepare class improvement plans. The groups report to the educational program assessment and improvement committee on the achievements of working groups. The external advisory committee examines whether the details of learning and the educational goals and standards can respond to the requirements of society and industry, and gives advice as needed to the educational program assessment and improvement committee. It checks the functioning of the educational assessment and improvement system in this group, and gives advice as needed about its improvement.

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Relationships between the evaluation items and class subjects

| Subject type | Class subjects | credits | Type of course registration | Period | Evaluation items | | | | | | | | | | | | | | | | Total weighted values of evaluation items in the subject |
|------------------------|---|---------|-----------------------------|------------|--|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|--|--|
| | | | | | Knowledge and Understanding | | | | Abilities and Skills | | | | Comprehensive Abilities | | | | | | | | |
| | | | | | (1) | | (1) | | (2) | | (1) | | (2) | | (3) | | (4) | | | | |
| | | | | | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | Weighted values of evaluation items | Weighted values of evaluation items in the subject | | |
| Liberal Arts Education | Introductory Seminar for First-Year Students | 2 | Required | 1 semester | 33 | 1 | | | | | 33 | 1 | | | 34 | 1 | | | 100 | | |
| Liberal Arts Education | Peace Science Courses | 2 | Required | 1 semester | 50 | 1 | | | | | 50 | 1 | | | | | | | 100 | | |
| Liberal Arts Education | Communication I | 1 | Required | 1 semester | 50 | 1 | | | | | | | | 50 | 1 | | | | 100 | | |
| Liberal Arts Education | Communication II | 1 | Required | 1 semester | 50 | 1 | | | | | | | | 50 | 1 | | | | 100 | | |
| Liberal Arts Education | Basic language I | 1 | Required | 1 semester | 50 | 1 | | | | | | | | 50 | 1 | | | | 100 | | |
| Liberal Arts Education | Basic language II | 1 | Required | 1 semester | 50 | 1 | | | | | | | | 50 | 1 | | | | 100 | | |
| Liberal Arts Education | Information Courses | 2 | Required | 1 semester | | | | | | | | | | 100 | 1 | | | | 100 | | |
| Liberal Arts Education | Area Courses | 2 | Elective | 1 semester | 100 | 1 | | | | | | | | | | | | | 100 | | |
| Liberal Arts Education | Free elective subjects | 6 | Elective | 1 semester | 100 | 1 | | | | | | | | | | | | | 100 | | |
| Liberal Arts Education | Health and Sports Courses | 2 | Required | 1 semester | 100 | 1 | | | | | | | | | | | | | 100 | | |
| Liberal Arts Education | Calculus I | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Calculus II | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Linear Algebra I | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Linear Algebra II | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Seminar in Basic Mathematics I | 1 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Seminar in Basic Mathematics II | 1 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | General Mechanics I | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | General Mechanics II | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Liberal Arts Education | Experimental Methods and Laboratory Work in Physics I | 1 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Creation of Architectural Space | 2 | Elective | 1 semester | 50 | 1 | | | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Lifestyle and the city | 2 | Elective | 1 semester | 50 | 1 | | | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Applied Mathematics I | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Applied Mathematics II | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Applied Mathematics III | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Engineering Mathematics A | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Probability and Statistics | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Synthesis of Applied Mathematics | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Mathematics | 2 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Basic Engineering Computer Programming | 2 | Required | 1 semester | | | | | 33 | 1 | | | | 33 | 1 | | 34 | 1 | 100 | | |
| Specialized Education | Exercise of Technical English | 1 | Required | 1 semester | | | | | | | | | | 100 | 1 | | | | 100 | | |
| Specialized Education | Civil and Environmental Engineering and Engineer's Ethics | 2 | Elective | 1 semester | | | | | | | 33 | 1 | 33 | 1 | 34 | 1 | | | 100 | | |
| Specialized Education | Strength of Materials | 2 | Required | 1 semester | | | 100 | 1 | | | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Strength of Materials | 1 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Structural Mechanics | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Structural Mechanics | 1 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Hydraulics | 2 | Required | 1 semester | | | 100 | 1 | | | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Hydraulics | 1 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Soil Mechanics | 2 | Required | 1 semester | | | 100 | 1 | | | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Soil Mechanics | 1 | Elective | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Materials Science | 2 | Required | 1 semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Fluid Mechanics | 2 | Required | 1 semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Concrete Engineering | 2 | Required | 1 semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Fundamentals of Environmental Science | 2 | Required | 1 semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Infrastructure Planning | 2 | Required | 1 semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 | | |
| Specialized Education | Land Survey | 2 | Required | 1 semester | | | | | 100 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Exercise of Surveying | 2 | Required | 1 semester | | | | | 25 | 1 | | | 25 | 1 | 25 | 1 | 25 | 1 | 100 | | |
| Specialized Education | Experiments in Civil and Environmental Engineering | 4 | Required | 1 semester | | | 20 | 1 | 20 | 1 | | | 20 | 1 | 20 | 1 | 20 | 1 | 100 | | |
| Specialized Education | Field Work at Construction Sites | 1 | Elective | 1 semester | | | | | | | 25 | 1 | 25 | 1 | 25 | 1 | 25 | 1 | 100 | | |
| Specialized Education | Energy Method for Structural Analysis | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Geotechnical Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Reinforced Concrete Mechanics and Exercises | 4 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Disaster Prevention Geotechnology | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Bridge and Earthquake-resistance | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Maintenance Engineering of Structures | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Road Engineering | 3 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Environmental Chemistry of Concrete | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Environmental Hydraulics | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Transportation System Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Sanitary and environmental engineering and exercise | 4 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Urban and Regional Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | River Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Coastal Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Fundamentals of Environmental Engineering | 2 | Elective | 1 semester | | | 50 | 1 | 50 | 1 | | | | | | | | | 100 | | |
| Specialized Education | Hydrology and Water Resource Engineering | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Ecology and civil engineering | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Meteorology | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Exercises in Algorithm | 2 | Elective | 1 semester | | | | | 33 | 1 | | | 33 | 1 | 34 | 1 | | | 100 | | |
| Specialized Education | Design of Infrastructures | 4 | Elective | 1 semester | | | 16 | 1 | 16 | 1 | 17 | 1 | 17 | 1 | 17 | 1 | 17 | 1 | 100 | | |
| Specialized Education | Project Management in Civil and Environmental Engineering | 2 | Elective | 1 semester | | | | | | | 100 | 1 | | | | | | | 100 | | |
| Specialized Education | Graduation Thesis | 5 | Elective | 1 semester | 14 | 1 | 14 | 1 | 14 | 1 | 14 | 1 | 14 | 1 | 15 | 1 | 15 | 1 | 100 | | |

