Appended Form 1

Specifications for Major Program

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

| | |
|---|---|
| Programname (Japanese) | &k ö% #” C d Û É ß ¢ Û Ò |
| (English) | Program of Civil and Environmental Engineering |
| 1. Academic degree to be Acquired>8Bachelor’s degree in Engineering | |

2. Overview

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 coexists 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

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

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

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

íThe 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

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

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

íThe ability to posi tion the existing technology related to research tasks, and to set goals

Applicable subjects: liberal arts education subjects, specialized basic subjects such as “Fundamentals of Environmental Science”, and “Infrastructure Planning”, specialized subjects such as “Design of Infrastructures”, and “Project Management in Civil and Environmental Engineering”, Graduation Thesis

(C) Ability to configure problems

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

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

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

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

Applicable subjects: specialized basicl subjects such as “Strength of Materials”, “Structural Mechanics” “Hydraulics”, “Soil Mechanics”, and “Experiments in Civil and Environmental Engineering”, specialized subjects such as “Geotechnical Engineering”, “Environmental Hydraulics”, and “Fundaments of Environmental Engineering”, Graduation Thesis

(D) Ability to analyze problems:

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

íThe ability to acquire information necessary to model phenomenon

íThe ability to seek solutions for the model using mathematical methods

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

Applicable subjects: Liberal arts education subjects such as “Calculus”, “Linear Algebras”, and “General Mechanics”, specialized basic subjects such as “Exercise of Structural Mechanics”, and “Exercise of Hydraulics”, specialized subjects such as “Energy Method for Structural Analysis”, and “Reinforced Concrete Mechanics and Exercises”, Graduation Thesis

(E>' Ability to evaluate:

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

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

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

íThe ability to explain knowledge gained from r esearch an its applicability, and the limitations and social significance of civil engineering technology

Applicable subjects: specialized subjects such as “Design of Infrastructures”, and “Civil and Environmental Engineering and Engineer's Ethics”, Graduation Thesis

(F) Communicating abilities

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

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

íThe ability to make one's ideas understood in a discussion forum and pres entation

íThe basic ability to communicate in Japanese and English

Applicable subjects: Liberal arts education subjects such as "Communication Courses", and "Second Foreign Languages", specialized basic subjects such as "Experiments in Civil and Environmental Engineering", specialized subjects such as "Design of Infrastructures", "Exercise of Technical English", and "Civil and Environmental Engineering and Engineer's Ethics", Graduation Thesis

( 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.

íThe ability to consider one's role in a group, and proceed with work in a planned manner

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

íThe ability to find knowledge to learn on one's own initiative in order to answer more c omplex questions

Applicable subjects: specialized basic subjects such as "Exercise of Surveying", and "Graduation Thesis"

| | |
|---|---|
| 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.)

This program approves graduation and awards a bachelor's degree in engineering to students who have completed four years' learning according to the standard of the course 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.

○ Goal of the Course Students are assigned to one of the various educational courses of Program of 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

○ When and how it is assigned

In principle, the educational subject is decided based on the student's request. However, the acceptable number of students for each educational subject is limited due to the requirement of providing sufficient guidance, so when the students' requests are distributed disproportionately some adjustment is made. The following is the schedule for the graduation thesis.

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.
2. In early March of the third year, how assignment and graduation theses in each educational course are conducted is explained.
3. At the end of March of the third year, after judging students' qualification to embark on a graduation thesis, where to assign students who meet the required standard is decided at an explanatory meeting.
4. How to proceed with graduation research varies depending on subject of research in educational course. Students begin with literature research, attend seminars, conduct surveys and experiments, and continue to work actively on research under the guidance of their supervisors. (The supervisors evaluate annual learning and research attitudes in mid-February.)
5. In December of the fourth year, a mid-term meeting about students' progress is held.
6. At the beginning of February of the fourth year, students submit their theses to two examining teachers (head/deputy head).
7. In mid-February of the fourth year, the final presentation meeting is held.

○ How academic results are evaluated

(1) Using research daybooks, seminar materials, research notebooks, related literature, and experiment reports, and others documents prepared by the students as a reference, the chief (supervisor) checks whether time has been devoted to study on a regular basis in a way that enhances problem-solving abilities voluntarily and continuously, and whether research has been conducted, and the supervisor evaluates the learning and research attitudes during the year (goals of the course 1-6).

(2) The deputy-head evaluates the attainment levels of the goals 1-6 of the course, based on the submitted theses.

(3) Furthermore, in the mid-term and final presentation meetings, multiple teachers in attendance evaluate mainly the attainment level of goal 5 of the course.

Students who have earned a rating of 60% or more in the above points (1), (2), and (3) are regarded as having passed and are awarded credit.

Other

The graduation research is a comprehensive course aimed at cultivating implementation and problem-solving abilities while developing each ability by using cultivation, the ability to identify challenges, the ability to configure problems, the ability to analyze problems, the ability to evaluate, and the communication abilities acquired through taking the courses in the Program of Civil and Environmental Engineering of Cluster 4 (construction and environment), School of Engineering, Hiroshima University.

Based on the submitted theses and presentation content, the acquisition status of the abilities (1-6) which graduates of this program must acquire, are evaluated in a comprehensive manner.

10. Responsibility System

(1) PDCA responsibility system (“Plan,” “Do,” “Check,” and “Act”)

To check and improve this program, the following two PDCA systems have been created.

í PDCA system for checking and improving each class subject and related subject

í PDCA system to check and improve the whole educational program, including educational goals and the image of students that is sent out

(2) Program evaluation

In cooperation with the academic affairs committee overseeing the educational assessment and improvement of the whole School of Engineering, the educational program assessment and improvement committee was created, under which the examination working group for each subject and the external advisory committee are established, and each implements educational assessment and evaluation according to the above two PDCA systems,

The educational program assessment and improvement committee checks the establishment of learning and educational goals and the disclosure of these. By getting a picture of the operational status of the assessment and improvement system, mainly undertaken by the examination working group for each subject, the committee checks the amount of learning and education, the educational tools, educational environment, and 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.

# Cluster 4 (Civil Engineering and Architecture

Required subject (period of registration specified)

○ Compulsory elective subject (any of these subjects shall be registered)

Free elective subject (any of these subjects shall be registered)

| Subject Type | | | | | Required No. of credits | Class subjects | No. of credits | Type of course registration | Year in which the subject is taken(*The lower figure means semester) Note 1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1st grade | | | | 2nd grade | | | | 3rd grade | | | | 4th grade | |
| | | | | | | | | | Spring | | Fall | | Spring | | Fall | | Spring | | Fall | | Spring | Fall |
| | | | | | | | | | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T |
| Liberal Arts Education Subjects | Peace Science Courses | | | | 2 | | 2 | Compulsory elective | | ○ | | | | | | | | | | | | | | | | | |
| | Common Subjects | Basic Courses in University Education | Introduction to University Education | | 2 | Introduction to University Education | 2 | Required | | | | | | | | | | | | | | | | | | | |
| | | | Introductory Seminar for First-Year | | 2 | Introductory Seminar for First-Year | 2 | Required | | | | | | | | | | | | | | | | | | | |
| | | Area Courses | | | 4 | Courses in Arts and Humanities/Social Sc | 2 | Compulsory elective | ○ | | ○ | | | | | | | | | | | | | | | | |
| | | | | | 4 | Courses in Natural Sciences | 2 | | | ○ | | ○ | | | | | | | | | | | | | | | | |
| | | Foreign Languages | English (Note2 3) | Basic English Usage | 0 | Basic English UsageI | 1 | Free elective | | | | | | | | | | | | | | | | | | | |
| | | | | | | Basic English UsageII | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | Communication I | 2 | CommunicationI | 1 | Required | | | | | | | | | | | | | | | | | | | |
| | | | | | | Communication I | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | Communication | 2 | Communication II | 1 | Required | | | | | | | | | | | | | | | | | | | |
| | | | | | | Communication II | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | Initial Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese, Korean and Arabic) | | 2 | 1 subjects from Basic language I | 1 | Compulsory elective | ○ | | | | | | | | | | | | | | | | | | |
| | | | | | | 1 subjects from Basic language II | 1 | | | ○ | | | | | | | | | | | | | | | | | | |
| | | Information and Data Science Courses | | | 2 | Introduction to Information and Data Sciencies | 2 | Required | | ◎ | | | | | | | | | | | | | | | | | |
| | | Health and Sports Courses | | | 2 | | 1or 2 | Compulsory elective | ○ | ○ | ○ | ○ | | | | | | | | | | | | | | | |
| | Basic Subjects | | | | 16 | CalculusI | 2 | Required | | | | | | | | | | | | | | | | | | | |
| | | | | | | CalculusII | 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Linear AlgebraI | 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Linear AlgebraII | 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Seminar in Basic Mathematics I | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Seminar in Basic Mathematics II | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | General Mechanics I | 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | General Mechanics II | 2 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Experimental Methods and Laboratory Work in Physics I Note 4 | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Experimental Methods and Laboratory Work in Physics II Note 4 | 1 | | | | | | | | | | | | | | | | | | | | |
| | Free elective subjects | | | | 6 | From all Subject Type Note 5 | | Free elective | | | | | | | | | | | | | | | | | | | |
| | No. of credits required for graduation | | | | 46 | | | | | | | | | | | | | | | | | | | | | | |

Note When students fail to acquire the credit during the term or semester marked with ○ in the boxes for the year in which the course is taken, they can take the course in subsequent terms or semesters. Depending on class subject, courses may be offered in semesters or terms different from those scheduled. Please be sure to check the time schedule for Liberal Arts Education subjects to be issued every

Note The credit obtained by mastery of "English-speaking Countries Field Research" or self-directed study of "Online Seminar in English A B" cannot be counted towards the credit necessary for graduation. The credit obtained by Overseas Language Training can be recognized as Communication or if application is made in advance. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note We have a recognition of credit system for foreign language proficiency tests. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note Students must take both Experimental Methods and Laboratory Work 1credit and Experimental Methods and Laboratory Work 1credit .

Note Students can calculate the credits of Basic English Usage.

# Cluster 4　Specialized Basic Subjects

Required subjects
○ } Compulsory Elective subjects
Request Subjects

| Class Subjects | Credits | Type of course registration: Civil and Environmental Engineering | Type of course registration: Architecture and Building Engineering | Class Hours/ Week: 1st grade Spring 1T | 1st grade Spring 2T | 1st grade Fall 3T | 1st grade Fall 4T | 2nd grade Spring 1T | 2nd grade Spring 2T | 2nd grade Fall 3T | 2nd grade Fall 4T | 3rd grade Spring 1T | 3rd grade Spring 2T | 3rd grade Fall 3T | 3rd grade Fall 4T | 4th grade Spring 1T | 4th grade Spring 2T | 4th grade Fall 3T | 4th grade Fall 4T | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Applied Mathematics I | 2 | | | | | 4 | | | | | | | | | | | | | | |
| Applied Mathematics II | 2 | | ○ | | | | | 4 | | | | | | | | | | | | |
| Applied Mathematics III | 2 | | ○ | | | | | | 4 | | | | | | | | | | | |
| Engineering Mathematics A | 2 | | ○ | | | | | | | | | 4 | | | | | | | | |
| Probability and Statistics | 2 | | ○ | | | | | 4 | | | | | | | | | | | | |
| Environmental Theory | 2 | | ○ | | | | | | | 2 | 2 | | | 2 | 2 | | | | | 1 |
| Basic Engineering Computer Programming | 2 | | | | | | | | | 4 | | 4 | | | | | | | | 2 |
| Synthesis of Applied Mathematics | 2 | | ○ | | | | | | | 4 | | | | | | | | | | |
| Technical English | 1 | | | | | | | | | 4 | | | | | | | | | | |
| Creation of Architectural Space | 2 | | ○ | | | 4 | | | | | | | | | | | | | | |
| Lifestyle and the city | 2 | | ○ | | | 4 | | | | | | | | | | | | | | |
| Exercise of Mathematics | 2 | | | | | | | | | | | | 4 | | | | | | | |
| Exercise of Technical English | 1 | | | | | | | | | | | | 4 | | | | | | | |
| Civil and Environmental Engineering and Engineer's Ethics | 2 | | | | | | | | | | | | | | 4 | | | | | |
| Strength of Materials | 2 | | | | | | | | 4 | | | | | | | | | | | |
| Exercise of Strength of Materials | 1 | | | | | | | | 4 | | | | | | | | | | | |
| Structural Mechanics | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Exercise of Structural Mechanics | 1 | | | | | | | | | 4 | | | | | | | | | | |
| Hydraulics | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Exercise of Hydraulics | 1 | | | | | | | | | 4 | | | | | | | | | | |
| Soil Mechanics | 2 | | | | | | | | | | 4 | | | | | | | | | |
| Exercise of Soil Mechanics | 1 | | | | | | | | | | 4 | | | | | | | | | |
| Materials Science | 2 | | | | | | | | 4 | | | | | | | | | | | |
| Concrete Engineering | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Fluid Mechanics | 2 | | | | | | | 4 | | | | | | | | | | | | |
| Infrastructure Planning | 2 | | | | | | | | | | 4 | | | | | | | | | |
| Fundamentals of Environmental Science | 2 | | | | | | | | | | 4 | | | | | | | | | |
| Land Survey | 2 | | | | | | | 4 | | | | | | | | | | | | |
| Exercise of Surveying | 2 | | | | | | | 8 | | | | | | | | | | | | |
| Field Work at Construction Sites | 1 | | | | | | | | | | | | | 4 | | | | | | |
| Experiments in Civil and Environmental Engineering | 2 | | | | | | | | | | | | 8 | | | | | | | |
| Building Material | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Experiments on Building Materials | 1 | | | | | | | | | | | 3 | 3 | | | | | | | |
| Introduction of Building Structure | 2 | | | | | | | | 4 | | | | | | | | | | | |

Required subjects

○ Compulsory Elective subjects

Request Subjects

| Class Subjects | Credits | Type of course registration: Civil and Environmental Engineering | Type of course registration: Architecture and Building Engineering | Class Hours/ Week: 1st grade Spring 1T | 1st grade Spring 2T | 1st grade Fall 3T | 1st grade Fall 4T | 2nd grade Spring 1T | 2nd grade Spring 2T | 2nd grade Fall 3T | 2nd grade Fall 4T | 3rd grade Spring 1T | 3rd grade Spring 2T | 3rd grade Fall 3T | 3rd grade Fall 4T | 4th grade Spring 1T | 4th grade Spring 2T | 4th grade Fall 3T | 4th grade Fall 4T | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Architectural Project and Drawing I | 2 | | | | | | | 6 | 6 | | | | | | | | | | | |
| Architectural Project and Drawing II | 2 | | | | | | | | | 6 | 6 | | | | | | | | | |
| Architectural Structural Mechanics I | 4 | | | | | | | 4 | 4 | | | | | | | | | | | |
| Architectural Structural Mechanics II | 4 | | | | | | | | | 4 | 4 | | | | | | | | | |
| Vibration Theory of Buildings | 2 | | ○ | | | | | | | | | | | | 4 | | | | | |
| Reinforced concrete structure | 2 | | | | | | | | | | | | 4 | | | | | | | |
| Geotechnical and Architectural Foundation Engineering | 2 | | ○ | | | | | | | | | | | | 4 | | | | | |
| Building Administration | 2 | | | | | | | | | | | | 4 | | | | | | | |
| Field Exercises of Building | 1 | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | |
| History of Japanese Architecture | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Architectural Planning | 2 | | | | | | | | 4 | | | | | | | | | | | |
| Town Planning | 2 | | ○ | | | | | | | | 4 | | | | | | | | | |
| Architectural Environments I | 2 | | | | | | | 4 | | | | | | | | | | | | |
| Architectural Environments II | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Exercises in Environmental Science | 1 | | | | | | | | | | | | 4 | | | | | | | |
| History of contemporary architecture I | 2 | | | | | | | | | | | 4 | | | | | | | | |
| Field Work in Architecture | 1 | | ○ | | | | | | | | | | | 3 | 3 | | | | | |
| Computer Technology in Architecture | 2 | | ○ | | | | | | | | 4 | | | | | | | | | |
| Design Concepts of Steel Structures | 2 | | | | | | | | | 4 | | | | | | | | | | |
| Architecture drawings | 2 | | ○ | | | | | 4 | | | | | | | | | | | | |
| Timber structure | 2 | | | | | | | | | | 4 | | | | | | | | | |

1 As the course is offered every other year, you should take either of the courses.

2 Civil and Environmental Engineering is offered in the second semester of the second year, while Architecture and Building Engineering is offered in the first term of the first semester of the third year.

# Cluster 4 Specialized Subjects
## Program of Civil and Environmental Engineering

Required subjects
○ Compulsory Elective subjec
Free elective subject

| Class Subjects | Credits | Type of course registration | Class Hours/ Week | | | | | | | | | | | | | | | | Not |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st grade | | | | 2nd grade | | | | 3rd grade | | | | 4th grade | | | | |
| | | | Spring | | Fall | | Spring | | Fall | | Spring | | Fall | | Spring | | Fall | | |
| | | | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | 1T | 2T | 3T | 4T | e |
| Reinforced Concrete Mechanics and Exercises | 3 | ○ | | | | | | | | | 8 | | | | | | | | |
| Geotechnical Engineering | 2 | ○ | | | | | | | | | 4 | | | | | | | | |
| Bridge and Earthquake-resistance | 2 | ○ | | | | | | | | | | | 4 | | | | | | |
| Disaster Prevention Geotechnology | 2 | ○ | | | | | | | | | | | 4 | | | | | | |
| Energy Method for Structural Analysis | 2 | ○ | | | | | | | | | 4 | | | | | | | | |
| Maintenance Engineering of Structures | 2 | | | | | | | | | | | | | | 4 | | | | |
| Environmental Chemistry of Concrete | 2 | | | | | | | | | | | | | | 4 | | | | |
| Sanitary and environmental engineering and exercise | 3 | ○ | | | | | | | | | 8 | | | | | | | | |
| Environmental Hydraulics | 2 | ○ | | | | | | | | | 4 | | | | | | | | |
| Transportation System Engineering | 2 | ○ | | | | | | | | | | 4 | | | | | | | |
| Coastal Engineering | 2 | ○ | | | | | | | | | | | | 4 | | | | | |
| River Engineering | 2 | ○ | | | | | | | | | | | | 4 | | | | | |
| Fundaments of Environmental Engineering | 2 | ○ | | | | | | | | | | | | 4 | | | | | |
| Urban and Regional Engineering | 2 | ○ | | | | | | | | | | | | 4 | | | | | |
| Hydrology and Water Resource Engineering | 2 | | | | | | | | | | | | | | 4 | | | | |
| Ecology and civil engineering | 2 | | | | | | | | | | | | | | 4 | | | | |
| Meteorology | 2 | | | | | | | | | | | | | | 4 | | | | |
| Exercises in Algorithm | 2 | ○ | | | | | | | | | | | | | 6 | | | | |
| Project Management in Civil and Environmental Engineering | 2 | | | | | | | | | | | | 4 | | | | | | |
| Design of Infrastructures | 2 | | | | | | | | | | | | 8 | | | | | | |
| Graduation Thesis | 5 | | | | | | | | | | | | | | | | | | |

# Academic Achievements in Civil and Environmental Engineering

## The Relationship between Evaluation Items and Evaluation Criteria

| Academic Achievements | | | Evaluation Criteria | | |
|---|---|---|---|---|---|
| Evaluation Items | | | Excellent | Very Good | Good |
| Knowledge and | (1) | General culture and breadth of vision | Being able to see broadened and complicated society and natural environment multilaterally from cross-disciplinary point of views such as nature, culture and society. | Being able to see broadened and complicated society and natural environment multilaterally from cross-disciplinary point of views such as nature, culture and society. | To be able to consider a society and its natural environment from cross-disciplinary perspectives such as nature, the humanities, and community. |
| Abilities and Skills | (1) | Ability to structuralize problems | Based on knowledge of mathematics or physics, to be able to structuralize technical problems by organizing the knowledge logically. | To be able to organize problems logically and explain them based on knowledge of mathematics or physics. | To be able to understand the relations between mathematical or physical equations and the problem. |
| | (2) | Ability to analyze problems | By collecting necessary information, to be able to abstract and simulate technical problems and to be able to analyze them. | By collecting necessary information, to be able to abstract and simulate technical problems and to be able to analyze them. | By collecting necessary information, to be able to analyze technical problems. |
| Overall Abilities | (1) | Ability to discover problems | To be able to understand the relationship among nature, human beings and technology in international society regional society and to be able to find issues in them. | Being able to understand the relationship among nature, human beings and technology in international society and regions. | To be able to understand the relationships among nature, humans, and technology in regional society |
| | (2) | Ability for evaluation | To be able to propose more than one solutions and predict the results of them and to be able to evaluate the solutions. | Being able to set a standard her/him self for evaluation and predict the result of proposed solutions | Being able to understand the criteria for evaluation on solutions. |
| | (3) | Abbility of communication | To be able to present the contents, reasonableness, effect, and feasibility of a proposed solution. | To be able to present the contents and reasonableness of proposed solutions. To other people. | To be able to present the contents of proposed solutions. |
| | (4) | Ability to achieve and ability to solve the problem | To be able to handle the problem-solving process with the best use of available knowledge, understanding, ability and skills under the collaboration with others. To be able to improve ability to solve problems and ability to achieve, voluntarily and continuously. | To be able to handle the problem-solving process with the best use of available knowledge, understanding, ability and skills under the collaboration with others. | With the best use of available knowledge, understanding, abilities and skills to be able to handle the problem-solving process. |

## Placement of the Liberal Arts Education in the Major Program

This program is designed so that abilities that correspond to the above evaluation items may be continuously enhanced by liberal arts education, specialized education, and the graduation thesis. The liberal arts education subject group, along with specialized basic subject group, constitutes the first cycle associated with all items described above, and cultivates the basic abilities associated with learning outcomes.
Design subjects, built on specialized subject group, constitute the second cycle and cultivate the applicable abilities associated with the learning outcomes.
Graduation thesis, as the third cycle, enhances the abilities associated with the learning outcomes in a comprehensive way.

Relationships between the evaluation items and class subjects

| | | | | | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | Weighted values of evaluation items in the subject | Weightsed values of evaluation items | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Liberal Arts Education | Introductory Seminar for First-Year Students | 2 | Required | 1semester | 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 | CommunicationI | 1 | Required | 1semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Communication I@ | 1 | Required | 1semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Communication II | 1 | Required | semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Communication II@ | 1 | Required | semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Basic language I | 1 | Required | 1semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Basic language II | 1 | Required | semester | 50 | 1 | | | | | | | | | 50 | 1 | | | 100 |
| Liberal Arts Education | Information and Data Science Courses | 2 | Required | 1semester | | | | | | | | | | | 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 | 1semester | 100 | 1 | | | | | | | | | | | | | 100 |
| Liberal Arts Education | CalculusI | 2 | Required | 1semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | CalculusII | 2 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | Linear AlgebraI | 2 | Required | 1semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | Linear AlgebraII | 2 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | Seminar in Basic Mathematics I | 1 | Required | 1semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | Seminar in Basic Mathematics II | 1 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | General Mechanics I | 2 | Required | 1semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | General Mechanics II | 2 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Liberal Arts Education | Experimental Methods and Laboratory Work in Physics I | 1 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Creation of Architectural Space | 2 | Elective | semester | 50 | 1 | | | | | 50 | 1 | | | | | | | 100 |
| Specialized Education | Lifestyle and the city | 2 | Elective | semester | 50 | 1 | | | | | 50 | 1 | | | | | | | 100 |
| Specialized Education | Applied Mathematics I | 2 | Required | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Applied Mathematics II | 2 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Applied Mathematics III | 2 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Engineering Mathematics A | 2 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Probability and Statistics | 2 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Synthesis of Applied Mathematics | 2 | Elective | 4semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Exercise of Mathematics | 2 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Basic Engineering Computer Programming | 2 | Required | 4semester | | | | | 33 | 1 | | | | | 33 | 1 | 34 | 1 | 100 |
| Specialized Education | Exercise of Technical English | 1 | Required | semester | | | | | | | | | | | 100 | 1 | | | 100 |
| Specialized Education | Civil and Environmental Engineering and Engineer's Ethics | 2 | Elective | semester | | | | | | | 33 | 1 | 33 | 1 | 34 | 1 | | | 100 |
| Specialized Education | Strength of Materials | 2 | Required | semester | | | 100 | 1 | | | | | | | | | | | 100 |
| Specialized Education | Exercise of Strength of Materials | 1 | Elective | semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Structural Mechanics | 2 | Required | 4semester | | | 100 | 1 | | | | | | | | | | | 100 |
| Specialized Education | Exercise of Structural Mechanics | 1 | Elective | 4semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Hydraulics | 2 | Required | 4semester | | | 100 | 1 | | | | | | | | | | | 100 |
| Specialized Education | Exercise of Hydraulics | 1 | Elective | 4semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Soil Mechanics | 2 | Required | 4semester | | | 100 | 1 | | | | | | | | | | | 100 |
| Specialized Education | Exercise of Soil Mechanics | 1 | Elective | 4semester | | | | | 100 | 1 | | | | | | | | | 100 |
| Specialized Education | Materials Science | 2 | Required | semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 |
| Specialized Education | Fluid Mechanics | **2**1 | Required | semester | | | 50 | 1 | | | 50 | 1 | | | | | | | 100 |

Sheet

# Curriculum Map

Program of Civil and Environmental Engineering

| Academic Achievement | | 1st grade | | 2nd grade | | 3rd grade | | 4th grade | |
|---|---|---|---|---|---|---|---|---|---|
| Evaluation Items | | Spring | Fall | Spring | Fall | Spring | Fall | Spring | Fall |
| Knowledge and Understanding | General culture and breadth of vision | Introductory Seminar for First-Year Students | Peace Science Courses | Free elective subjects | Free elective subjects | | | Graduation Thesis | Graduation Thesis |
| | | Peace Science Courses | Area Courses | | | | | | |
| | | Area Courses | Free elective subjects | | | | | | |
| | | Free elective subjects | Lifestyle and the city | | | | | | |
| | | Health and Sports Courses | Creation of Architectural Space | | | | | | |
| | | Communication IA | Communication IIA | | | | | | |
| | | Communication IB | Communication IIB | | | | | | |
| | | Basic language I | | | | | | | |
| | | Basic language | | | | | | | |
| Abilities and Skills | Ability to structuralize problems | | | Materials Science | Fundamentals of Environmental Science | Experiments in Civil and Environmental Engineering | Design of Infrastructures | Graduation Thesis | Graduation Thesis |
| | | | | Fluid Mechanics | Concrete Engineering | Reinforced Concrete Mechanics and Exercises | Bridge and Earthquake-resistance | Maintenance Engineering of Structures | |
| | | | | Strength of Materials | Soil Mechanics | Sanitary and environmental engineering and exercise | Disaster Prevention Geotechnology | Hydrology and Water Resource Engineering | |
| | | | | | Structural Mechanics | Geotechnical Engineering | River Engineering | Meteorology | |
| | | | | | Infrastructure Planning | Environmental Hydraulics | Coastal Engineering | Ecology and civil engineering | |
| | | | | | Hydraulics | Transportation System Engineering | Fundaments of Environmental Engineering | Environmental Chemistry of Concrete | |
| | | | | | | | Energy Method for Structural Analysis | | |
| | | | | | | | Urban and Regional Engineering | | |
| | Ability to analyze problems | CalculusI | CalculusII | Applied Mathematics II | Synthesis of Applied Mathematics | Engineering Mathematics A | Design of Infrastructures | Graduation Thesis | Graduation Thesis |
| | | Linear AlgebraI | Linear AlgebraII | Applied Mathematics III | Exercise of Soil Mechanics | Exercise of Mathematics | Bridge and Earthquake-resistance | | |
| | | General Mechanics I | Applied Mathematics I | Probability and Statistics | Structural Mechanics | Experiments in Civil and Environmental Engineering | Disaster Prevention Geotechnology | | |
| | | Seminar in Basic Mathematics II | General Mechanics II | Experimental Methods and Laboratory Work in Physics I | Hydraulics | Reinforced Concrete Mechanics and Exercises | River Engineering | | |
| | | | Seminar in Basic Mathematics II | Land Survey | Basic Engineering Computer Programming | Sanitary and environmental engineering and exercise | Coastal Engineering | | |
| | | | | Exercise of Surveying | | Geotechnical Engineering | Fundaments of Environmental Engineering | | |
| | | | | Exercise of Strength of Materials | | Environmental Hydraulics | Urban and Regional Engineering | | |
| | | | | | | Transportation System Engineering | Exercises in Algorithm | | |
| | | | | | | | Energy Method for Structural Analysis | | |
| Comprehensive Abilities | Ability to discover problems | Introductory Seminar for First-Year Students | Lifestyle and the city | Materials Science | Fundamentals of Environmental Science | | Civil and Environmental Engineering and Engineer's Ethics | Graduation Thesis | Graduation Thesis |
| | | Peace Science Courses | Creation of Architectural Space | Fluid Mechanics | Concrete Engineering | | Design of Infrastructures | Maintenance Engineering of Structures | |
| | | Health and Sports Courses | Peace Science Courses | | Infrastructure Planning | | Project Management in Civil and Environmental Engineering | Hydrology and Water Resource Engineering | |
| | | | | | | | Field Work at Construction Sites | Meteorology | |
| | | | | | | | | Ecology and civil engineering | |
| | | | | | | | | Environmental Chemistry of Concrete | |
| | Ability for evaluation | | | Exercise of Surveying | | Experiments in Civil and Environmental Engineering | Civil and Environmental Engineering and Engineer's Ethics | Graduation Thesis | Graduation Thesis |
| | | | | | | | Design of Infrastructures | | |
| | | | | | | | Field Work at Construction Sites | | |
| | Abbility of communication | Introductory Seminar for First-Year Students | Communication IIA | | | Experiments in Civil and Environmental Engineering | Civil and Environmental Engineering and Engineer's Ethics | Graduation Thesis | Graduation Thesis |
| | | Communication IA | Communication IIB | Exercise of Surveying | Basic Engineering Computer Programming | Exercise of Technical English | Design of Infrastructures | | |
| | | Communication IB ◎ | | | | | Field Work at Construction Sites | | |
| | | Basic language I | | | | | Exercises in Algorithm | | |
| | | Basic language | | | | | | | |
| | | Information and Data Science Courses ◎ | | | | | | | |
| | Ability to achieve and ability to solve | | | Exercise of Surveying | Basic Engineering Computer Programming | Experiments in Civil and Environmental Engineering | Design of Infrastructures | Graduation Thesis | Graduation Thesis |
| | | | | | | | Field Work at Construction Sites | | |
| | | | | | | | Exercises in Algorithm | | |

Ex Liberal Arts Education Subjects | Basic Specialized Subjects | Specialized Subjects | Graduation Thesis

Required Compulsory elective Free elective