Appended Form 1

Specifications for Major Program

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

Program name (Japanese)	社会基盤環境工学プログラム
(English)	Program of Civil and Environmental Engineering

1. Academic degree to be Acquired : Bachelor'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 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 of local, related to coexistence between mankind's activities and the 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. This program awards a bachelor's degree in 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, and ability to identify issues

(C) The ability to configure problems: The ability to organize problems logically and construct technical issues

(D) The ability to analyze problems: The ability to gather the necessary data, and to abstract, model, and analyze technical issues

(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.

In the curriculum, teaching and learning will be implemented by utilizing active learning and online classes, depending on the delivery methods of the program, such as lectures and seminars.

In addition to strict grading using the standards clearly outlined in the syllabus, learning outcomes are evaluated based on the degree to which the goals set by the educational program are achieved.

(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 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
・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 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
・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 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
・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 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

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

・The ability to make one's ideas understood in a discussion forum and presentation

・The 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.

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

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

・The ability to find knowledge to learn on one's own initiative in order to answer more complex questions

○Applicable subjects: specialized basic subjects such as "Exercise of Surveying", "Basic Engineering Computer Programming", and "Experiments in Civil and Environmental Engineering", mainly specialized subjects such as "Design of Infrastructures", Graduation Thesis

5. Program Timing and Acceptance Conditions

When the first year students who are enrolled in Cluster 4 of the School of Engineering (construction and environment) advance to 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

By completing the program, guraduates can obtain a license of an assistant surveyors upon request. 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, graduates can obtain these licentiates.

By completing "Vocational Guidance", "Comprehensive Exercises", and liberal 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.

8.　Academic Achievements

At the end of each semester, evaluation criteria are applied to each evaluation item of academic achievement to clearly demonstrate the attainment level. Students' grade calculations for each subject, from admission to the university until the current semester, is given as one of three levels: "Excellent," "Very Good," and "Good," based on evaluation criteria calculated by adding weighted values to the numerically-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		Academic achievement	Evaluation criteria
S (Excellent: 90 points or higher)	4		Excellent	3.00～4.00
A (Superior:80-89 points)	3		Very Good	2.00～2.99
B (Good: 70-79 points)	2		Good	1.00～1.99
C (Fair: 60-69 points)	1			

* 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. At the end of November or at the beginning of 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.

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

・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)

Year in which the subject is taken (*The lower figure means semester) (Note 1)

Term columns are grouped by grade: 1st grade (Spring 1T, 2T / Fall 3T, 4T), 2nd grade (Spring 1T, 2T / Fall 3T, 4T), 3rd grade (Spring 1T, 2T / Fall 3T, 4T), 4th grade (Spring 1T, 2T / Fall 3T, 4T).

Subject Type	Req. credits	Class subjects	No. of credits	Type of course registration	1g-1T	1g-2T	1g-3T	1g-4T	2g-1T	2g-2T	2g-3T	2g-4T	3g-1T	3g-2T	3g-3T	3g-4T	4g-1T	4g-2T	4g-3T	4g-4T
Liberal Arts Education Common Subjects — Peace Science Courses	2		2	Compulsory elective			○													
Basic Courses in University Education — Introduction to University Education	2	Introduction to University Education	2	Required	◎															
Basic Courses in University Education — Introductory Seminar for First-Year	2	Introductory Seminar for First-Year	2	Required	◎															
Basic Courses in University Education — Advanced Seminar	0		1	Free elective			△	△												
Common Subjects — Area Courses	4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective	○		○													
Common Subjects — Area Courses	4	Courses in Natural Sciences	2	Compulsory elective		○		○												
Foreign Languages — English — Basic English Usage	0	Basic English UsageI	1	Free elective	△	△														
Foreign Languages — English — Basic English Usage		Basic English UsageII	1	Free elective			△	△												
Foreign Languages — English — Communication I	2	CommunicationIA	1	Required	◎	◎														
Foreign Languages — English — Communication I		Communication IB	1	Required	◎	◎														
Foreign Languages — English — Communication II	2	Communication IIA	1	Required					◎	◎										
Foreign Languages — English — Communication II		Communication IIB	1	Required					◎	◎										
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	○															
Initial Foreign Languages		1 subjects from Basic language II	1	Compulsory elective		○														
Information and Data Science Courses	2	Introduction to Information and Data Sciencies	2	Required		◎														
Health and Sports Courses	2		1or2	Compulsory elective	○	○	○	○												
Basic Subjects	16	CalculusI	2	Required	◎															
Basic Subjects		CalculusII	2	Required					◎											
Basic Subjects		Linear AlgebraI	2	Required						◎										
Basic Subjects		Linear AlgebraII	2	Required								◎								
Basic Subjects		Seminar in Basic Mathematics I	1	Required						◎										
Basic Subjects		Seminar in Basic Mathematics II	1	Required								◎								
Basic Subjects		General Mechanics I	2	Required						◎										
Basic Subjects		General Mechanics II	2	Required								◎								
Basic Subjects		Experimental Methods and Laboratory Work in Physics I (Note 4)	1	Required					◎											
Basic Subjects		Experimental Methods and Laboratory Work in Physics II (Note 4)	1	Required							◎									
Free elective subjects	6	From all Subject Type (Note 5)		Free elective	△	△	△	△	△	△	△	△								
No. of credits required for graduation	46																			

Note 1: 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 2: 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 Ⅰ or Ⅱ 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 3: We have a recognition of credit system for foreign language proficiency tests. For more details, please refer to the article on Foreign Language in Liberal Arts Education in the student handbook.

Note 4: Students must take both「Experimental Methods and Laboratory WorkⅠ(1credit)」and「Experimental Methods and Laboratory WorkⅡ (1credit)」.

Cluster 4　Specialized Basic Subjects

◎　　　　　　　Required subjects
①, ②, ③　　　⎫
○, Ⓐ, Ⓑ, Ⓓ　⎬　Compulsory Elective subjects
△　　　　　　　Request Subjects

Type of course registration — CEE = Civil and Environmental Engineering; ABE = Architecture and Building Engineering. Class Hours/Week shown by grade and term (Spring: 1T, 2T; Fall: 3T, 4T).

Class Subjects	Credits	CEE	ABE	1G 1T	1G 2T	1G 3T	1G 4T	2G 1T	2G 2T	2G 3T	2G 4T	3G 1T	3G 2T	3G 3T	3G 4T	4G 1T	4G 2T	4G 3T	4G 4T	Note
Applied Mathematics I	2	◎	◎			4														
Applied Mathematics II	2	①	○					4												
Applied Mathematics III	2	①	○						4											
Engineering Mathematics A	2	①	○									4								
Probability and Statistics	2	①	○					4												
Environmental Theory	2		○							2	2			2	2					※1
Basic Engineering Computer Programming	2	◎	◎							4		4								※2
Synthesis of Applied Mathematics	2	①	○							4										
Technical English	1		◎							4										
Creation of Architectural Space	2	③	○			4														
Lifestyle and the city	2	③	○			4														
Introduction of Civil and Environmental Engineering	2	◎						4												
Mathematics of Civil Engineering	2	①							4											
Exercise of Technical English	1	◎											4							
Strength of Materials	2	◎							4											
Exercise of Strength of Materials	1	②							4											
Structural Mechanics	2	◎								4										
Exercise of Structural Mechanics	1	②								4										
Hydraulics	2	◎									4									
Soil Mechanics	2	◎									4									
Exercise of Soil Mechanics	1	②									4									
Construction Materials	2	◎							4											
Concrete Engineering	2	◎								4										
Fluid Mechanics	2	◎								4										
Exercise of Fluid Mechanics	1	②								4										
Infrastructure Planning	2	◎									4									
Environmental Chemistry for Atmosphere and Water	2	◎						4												
Microbiology and Ecology for Engineering	2	◎							4											
Land Surveying and Exercise	3	◎						8												
Applied Surveying and Advanced Measurements	2	◎												4						
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
①, ②, ③ Compulsory Elective subjects
○, Ⓐ, Ⓑ, Ⓓ subjects
△ Request Subjects

Class Subjects	Credits	Civil and Environmental Engineering	Architecture and Building Engineering	1st grade Spring 1T	2T	Fall 3T	4T	2nd grade Spring 1T	2T	Fall 3T	4T	3rd grade Spring 1T	2T	Fall 3T	4T	4th grade Spring 1T	2T	Fall 3T	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 Architecture I	2		◎							4										
Architectural Planning I	2		◎						4											
Town Planning	2		○								4									
Architectural Environments I	2		Ⓑ					4												
Architectural Environments II	2		Ⓑ							4										
Exercises in Environmental Science	1		Ⓑ										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 subject
△Free elective subject

Class Subjects	Credits	Type of course registration	1st grade Spring		1st grade Fall		2nd grade Spring		2nd grade Fall		3rd grade Spring		3rd grade Fall		4th grade Spring		4th grade Fall		Note
			1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Reinforced Concrete Mechanics and Exercises	3	○									8								
Geotechnical Engineering	2	○									4								
Seismic Analysis and Design of Bridges	2	○									4								
Disaster Prevention and Mitigation	2	△											4						
Energy Methods for Structural Analysis	2	○									4								
Maintenance Engineering of Structures	2	△											4						
Environmental Chemistry of Concrete	2	△												4					
Water and Wastewater Engineering and Exercises	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 Resources Engineering	2	△												4					
Exercises in Algorithms of Civil Engineering	2	△													6				
Project Management in Civil and Environmental Engineering	2	◎											4						
Seminar in Civil and Environmental Engineering	3	◎											4	4					
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

Subject type	Class subjects	credits	Type of course registration	Period	Knowledge and Understanding (1) — subject	— items	Abilities and Skills (1) — subject	— items	Abilities and Skills (2) — subject	— items	Comprehensive Abilities (1) — subject	— items	Comprehensive Abilities (2) — subject	— items	Comprehensive Abilities (3) — subject	— items	Comprehensive Abilities (4) — subject	— items	Total weighted values
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	1~2semester	50	1					50	1							100
Liberal Arts Education	CommunicationI A	1	Required	1semester	50	1									50	1			100
Liberal Arts Education	Communication I B	1	Required	1semester	50	1									50	1			100
Liberal Arts Education	Communication II A	1	Required	2semester	50	1									50	1			100
Liberal Arts Education	Communication II B	1	Required	2semester	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	1semester	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	1~2semester	100	1													100
Liberal Arts Education	Free elective subjects	6	Elective	1~4semester	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	2semester					100	1									100
Liberal Arts Education	Linear AlgebraI	2	Required	1semester					100	1									100
Liberal Arts Education	Linear AlgebraII	2	Required	2semester					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	2semester					100	1									100
Liberal Arts Education	General Mechanics I	2	Required	1semester					100	1									100
Liberal Arts Education	General Mechanics II	2	Required	2semester					100	1									100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I・II	1	Required	3semester					100	1									100
Specialized Education	Creation of Architectural Space	2	Elective	2semester	50	1					50	1							100
Specialized Education	Lifestyle and the city	2	Elective	2semester	50	1					50	1							100
Specialized Education	Applied Mathematics I	2	Required	2semester					100	1									100
Specialized Education	Applied Mathematics II	2	Elective	3semester					100	1									100
Specialized Education	Applied Mathematics III	2	Elective	3semester					100	1									100
Specialized Education	Engineering Mathematics A	2	Elective	3semester					100	1									100
Specialized Education	Probability and Statistics	2	Elective	3semester					100	1									100
Specialized Education	Synthesis of Applied Mathematics	2	Elective	4semester					100	1									100
Specialized Education	Mathematics for Civil Engineering	2	Elective	3semester					100	1									100
Specialized Education	Basic Engineering Computer Programming	2	Required	4semester					33	1					33	1	34	1	100
Specialized Education	Introduction of Civil and Environmental Engineering	2	Required	3semester			50	1			50	1							100
Specialized Education	Exercise of Technical English	1	Required	5semester											100	1			100
Specialized Education	Strength of Materials	2	Required	3semester			100	1											100
Specialized Education	Exercise of Strength of Materials	1	Elective	3semester					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 Fluid Mechanics	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	Construction Materials	2	Required	3semester			50	1			50	1							100
Specialized Education	Fluid Mechanics	2	Required	3semester			100	1											100
Specialized Education	Concrete Engineering	2	Required	4semester			50	1			50	1							100
Specialized Education	Environmental Chemistry for Atmosphere and Water	2	Required	3semester			50	1			50	1							100
Specialized Education	Microbiology and Ecology for Engineering	2	Required	3semester			50	1			50	1							100
Specialized Education	Infrastructure Planning	2	Required	3semester			50	1			50	1							100
Specialized Education	Land Surveying and Exercise	2 3	Required	3semester					40	1	15	1	15	1	15	1	15	1	100
Specialized Education	Applied Surveying and Advanced Measurement	2	Required	5semester			50	1			50	1							100
Specialized Education	Experiments in Civil and Environmental Engineering	4	Required	5semester			16	1	16	1	17	1	17	1	17	1	17	1	100
Specialized Education	Field Work at Construction Sites	1	Elective	6semester							25	1	25	1	25	1	25	1	100
Specialized Education	Energy Methods for Structural Analysis	2	Elective	6semester			50	1	50	1									100
Specialized Education	Geotechnical Engineering	2	Elective	5semester			50	1	50	1									100
Specialized Education	Reinforced Concrete Mechanics and Exercises	4	Elective	5semester			50	1	50	1									100
Specialized Education	Disaster Prevention and Mitigation	2	Elective	6semester			50	1	50	1									100
Specialized Education	Bridge and Earthquake-resistance	2	Elective	5semester			50	1	50	1									100
Specialized Education	Maintenance Engineering of Structures	2	Elective	6semester							100	1							100
Specialized Education	Environmental Chemistry of Concrete	2	Elective	6semester							100	1							100
Specialized Education	Environmental Hydraulics	2	Elective	5semester			50	1	50	1									100
Specialized Education	Transportation System Engineering	2	Elective	5semester			50	1	50	1									100
Specialized Education	Water and Wastewater Engineering and Exercises	4	Elective	6semester			50	1	50	1									100
Specialized Education	Urban and Regional Engineering	2	Elective	6semester			50	1	50	1									100
Specialized Education	River Engineering	2	Elective	5semester			50	1	50	1									100
Specialized Education	Coastal Engineering	2	Elective	6semester			50	1	50	1									100
Specialized Education	Fundaments of Environmental Engineering	2	Elective	6semester			50	1	50	1									100
Specialized Education	Hydrology and Water Resources Engineering	2	Elective	6semester							100	1							100
Specialized Education	Exercises in Algorithms of Civil Engineering	2	Elective	7semester					33	1					33	1	34	1	100
Specialized Education	Seminar in Civil and Environmental Engineering	4	Elective	6semester			16	1	16	1	17	1	17	1	17	1	17	1	100

	1st Grade		2nd Grade		3rd Grade		4th Grade	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
A General culture and breadth of vision	Introductory Seminar for First-Year Students Peace Science Courses Pakage Courses Area Courses Communication I Basic language I Health and Sports Courses	Peace Science Courses Pakage Courses Area Courses Communication II Basic language II Health and Sports Courses Lifestyle and the city Creation of Architectural Space	Area Courses Communication III	Area Courses Communication III			Graduation Thesis	
B Ability to discover problems	Introductory Seminar for First-Year Students Peace Science Courses	Peace Science Courses Lifestyle and the city Creation of Architectural Space			Applied Surveying and Advanced Measurements	Project Management in Civil and Environmental Engineering		
C Ability to structuralize problems			Specialized Basic Subjects		Specialized Subjects			
D Ability to analyze problems	Calculus I Linear Algebra I Mathematics Exercises I General Mechanics I	Calculus II Linear Algebra II Mathematics Exercises II General Mechanics II Applied Mathematics I	Physics Experiments Applied Mathematics II Applied Mathematics III Probability and Statistics Mathematics of Civil Engineering Specialized Basic Subjects Land Surveying and Exercise	Basic Engineering Computer Programming	Applied Mathematics A Specialized Subjects Applied Surveying and Advanced Measurements	Experiments in Civil and Environmental Engineering / Seminar in Civil and Environmental Engineering		
E Ability for evaluation		Land Surveying and Exercise						
F Abbility of communication	Introductory Seminar for First-Year Students Communication I Second foreign language Information and Data Science Courses	Communication II Second foreign language	Communication III Land Surveying and Exercise	Communication III Basic Engineering Computer Programming	Technical English			
G Ability to achieve and			Land Surveying and Exercise	Basic Engineering Computer Programming				