

For entrants in AY 2022

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 Bachelor's degree in Engineering	
<p>2. Overview</p> <p>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.</p>	
<p>3. Academic Awards Policy (Policy for awarding degrees and goal of the program)</p> <p>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.</p> <p>(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</p> <p>(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</p> <p>(C) The ability to configure problems: The ability to organize problems logically and construct technical issues</p> <p>(D) The ability to analyze problems: The ability to gather the necessary data, and to abstract, model, and analyze technical issues</p> <p>(E) The ability to evaluate: The ability to propose multiple solutions, predict outcomes, and evaluate relative merits</p> <p>(F) Communication abilities: The ability to communicate to others the details of the proposed solutions, their rationale, their effects, and their feasibility</p> <p>(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,</p>	
<p>4. Curriculum Policy</p> <p>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</p>	

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

The ability to explain knowledge gained from research and 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-

Evaluation of academic achievement	Converted values
S (Excellent: 90 points or higher)	
A (Superior:80-89 points)	
B (Good: 70-79 points)	
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

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	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
					1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Peace Science Courses	2		2	Compulsory elective																
Basic Courses in University Education	2	Introduction to University Education	2	Required																
	2	Introductory Seminar for First-Year	2	Required																
Common Subjects	4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective																
	4	Courses in Natural Sciences	2																	
Foreign Languages	0	Basic English Usage	1	Free elective																
			1																	
	2	Communication I	1	Required																
			1																	
	2	Communication II	1	Required																
			1																	
	2	Initial Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese, Korean and Arabic)	1 subjects from Basic language I	Compulsory elective																
			1 subjects from Basic language II		1															
2	Information and Data Science Courses	2	Required									©								
2	Health and Sports Courses	2	1 or 2	Compulsory elective																
Basic Subjects	16	Calculus I	2	Required																
		Calculus II	2																	
		Linear Algebra I	2																	
		Linear Algebra II	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 year.
- 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 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 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.

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.
(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)	Ability 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.

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 (Δ)	Free elective subjects (Δ)			Graduation Thesis(◎)	Graduation Thesis(◎)
		Peace Science Courses(○)	Area Courses(○)						
		Area Courses(○)	Free elective subjects (Δ)						
		Free elective subjects (Δ)	Lifestyle and the city(○)						
		Health and Sports Courses(○)	Creation of Architectural Space(○)						
		Communication IA(◎)	Communication IIA(◎)						
		Communication IB(◎)	Communication IIB(◎)						
		Basic language I(○)							
Abilities and Skills	Ability to structuralize problems	Basic language II(○)		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(Δ)	
				Strength of Materials(◎)	Soil Mechanics(◎)	Sanitary and environmental engineering and exercise(○)	Disaster Prevention Geotechnolgy(○)	Hydrology and Water Resource Engineering(Δ)	
					Structural Mechanics(◎)	Geotechnical Engineering(○)	River Engineering(○)	Meteorology(Δ)	
					Infrastructure Planning(◎)	Environmental Hydraulics(○)	Coastal Engineering(○)	Ecology and civil engineering(Δ)	
					Hydraulics(◎)	Transportation System Engineering(○)	Fundamentals of Environmental Engineering(○)	Environmental Chemistry of Concrete(Δ)	
							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 Geotechnolgy(○)		
		Seminar in Basic Mathematics II(◎)	General Mechanics II(◎)	Experimental Methods and Laboratory Work in Physics I-III(◎)	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(○)	Fundamentals of Environmental Engineering(○)		
				Exercise of Strength of Materials(○)		Environmental Hydraulics(○)	Urban and Regional Engineering(○)		
						Transportation System Engineering(○)	Exercises in Algorithm(○)		
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(Δ)		
		Health and Sports Courses(○)	Peace Exercise of Surveying(◎)						
	Ability for evaluation								
	Ability of communication								
	Ability to achieve and ability to solve				Basic Engineering Computer Programming(◎)	Experiments in Civil and Environmental Engineering(◎)	Design of Infrastructures(◎)	Graduation Thesis(◎)	Graduation Thesis(◎)
							Field Work at Construction Sites(Δ)		
						Exercises in Algorithm(○)			

(Ex) Liberal Arts Education Subjects

Basic Specialized Subjects

Specialized Subjects

Graduation Thesis

(◎)Required (○)Compulsory elective (Δ)Free elective