

Appended Form 1

Specifications for Major Program

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

Program name (Japanese)	プログラム
(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>	
3. Academic Awards Policy (Policy for awarding degrees and goal of the program)	

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 “Fundamentals 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 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-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, graduates 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,

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

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)

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																	
		0	Advanced Seminar	1	Free elective																	
Common Subjects	Area Courses	4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective																	
		4	Courses in Natural Sciences	2																		
	Foreign Languages	Basic English Usage	0	Basic English Usage I	1	Free elective																
			1	Basic English Usage II	1																	
		Communication I	2	Communication I	1	Required																
			1	Communication I	1																	
		Communication	2	Communication II	1	Required																
			1	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	1 subjects from Basic language II	1																		
	2	Information and Data Science Courses	2	Introduction to Information and Data Sciences	2	Required																
	2	Health and Sports Courses	2		1 or 2	Compulsory elective																
Basic Subjects	16	2	Calculus I	2	Required																	
		2	Calculus II	2																		
		2	Linear Algebra I	2																		
		2	Linear Algebra II	2																		
		1	Seminar in Basic Mathematics I	1																		
		1	Seminar in Basic Mathematics II	1																		
		2	General Mechanics I	2																		
		2	General Mechanics II	2																		
		1	Experimental Methods and Laboratory Work in Physics I Note 4	1																		
		1	Experimental Methods and Laboratory Work in Physics II Note 4	1																		
6	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 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 Foreign Language 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 .

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)	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. Seminar, built on specialized subject group, constitute the second cycle and cultivate the applicable abilities associated with the learning outcomes and the abilities required to proceed graduation research. Graduation thesis, as the third cycle, enhances the abilities associated with the learning outcomes in a

	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 Package Courses Area Courses Communication I Basic language I Health and Sports Courses	Peace Science Courses Package 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				
B Ability to discover problem	Introductory Seminar for First-Year Students Peace Science Courses	Peace Science Courses Lifestyle and the city Creation of Architectural Space						Project Management in Civil and Environmental Engineering
C Ability to structure problem								
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			Applied Mathematics A		
E Ability for evaluation			Land Surveying and Exercise	Basic Engineering Computer Programming		Applied Surveying and Advanced Measurements		
F Ability 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	Communication III		Technical English		
G Ability to achieve and			Land Surveying and Exercise	Basic Engineering Computer Programming				