Graduate Major in Global Engineering for Development, Environment and Society

【Master's Degree Program】

1. Outline

Science and technology have developed dramatically through the advancement, specialization, and subdivision of the existing academic disciplines. Further, the world has shrunk rapidly through the spread of globalization. However, complex problems such as global environmental issues have plagued the international society and cannot be solved by simply integrating each elemental technology. Furthermore, a change in the industrial structure has been accelerated by the maturation of the industry and society of developed countries, including ours. Creation of a new technology, value, and concept that offer a new perspective without being biased towards the framework of the existing academic system is urgently required.

The aim of the educational program is to build the ability to (1) create a new technology, value, and concept required in the society and (2) solve the numerous problems faced by the international society with an accurate understanding, without being biased towards the framework of the existing academic system, to cope with the above social change. Moreover, the education aims to equip global engineers with the “ability to co-create” including communication skills to work effectively in cooperation with an engineer from a different field and management skills to operate multiple projects or an organization.

2. Competencies Developed

In this program, students will acquire the following skills:

I. Fundamental ability applicable to diverse related fields
- Theoretical and mathematical ability to think and analyze
- Ability to understand physical and natural phenomena
- Ability to use measurement and calculation technology for general purpose

II. Application ability without being biased towards the framework of the existing academic system
- Ability to solve a problem using an appropriate method
- Ability to plan, propose, and examine the new technology, value, and concept
- Ability to design and operate a system

III. Global Engineering Skills
- Ability to work in international cooperation (communication and presentation)
- Social responsibility and sense of ethics
- Self-deployment skills (autonomy and ability to take action)

3. Learning Goals

The department offers the educational program for the following purposes to allow students to master the above-mentioned skills:

A) Acquire the basic academic skills to specialize in the field of global engineering for development, environment, and society (to master I):

By acquiring the basic academic skills to specialize in the field of global engineering for development, environment, and society, students will find out the problem and improve their understanding of the methodology to solve it.

B) Acquire the academic skills in the diverse fields related to global engineering for development, environment, and society (to

master I and II)

Students will acquire not only the academic skills of one specialized field but also the interdisciplinary academic skills across several related fields.

C) Acquire the ability to find out and solve the problem by themselves (to master II and III)

Acquire and develop the practical skills to solve a problem through lecture and practice on a social, environmental, and international project while complying with engineer's ethics

D) Acquire the ability to understand and systematize the latest trend in the research field (to master II and III)

Students will develop research abilities to systematize studies conducive to the development of the specialized field. They will understand the relevance and contribution of one's own studies as well as the latest research trend in the field.

E) Acquire practical international communication skills (to master III)

Students will cultivate communication skills in the mixed educational environment in laboratories that includes both Japanese and foreign students. In addition, students will acquire the practical skills to work in international cooperation through practical experience including international internship.

4. IGP Completion Requirements

The following requirements must be met to complete the Master's Degree Program of this major.

1. Attain a total of 30 credits or more from 400- and 500-level courses.
2. Fulfill requirements in Table M1 below.
3. Pass the master's thesis review and defense.

Table M1 shows course categories and the number of credits required to complete the Master's Degree Program of this major. It also shows the required minimum credits in each course category and points to be noted when selecting the required courses and electives.

The learning goals to be obtained by students through courses are listed as "associated learning goals". Prior to registering courses, students need to fully understand the course goals.

Table M1. Graduate Major in Global Engineering for Development, Environment and Society Completion Requirements

Course category		<Required courses> Required credits	<Electives> Minimum credits required	Minimum credits required	Associated learning goals	Comments
Liberal arts and basic science courses	Humanities and social science courses		•2 credits from 400-level •1 credit from 500-level	5 credits	C	
	Career development courses		2 credits		C,D,E	All Graduate Attributes (GA) should be acquired. (Refer to Section 7 for the definition of GA.)
	Other courses					
Core courses	Research seminars	Seminar for Global Engineering S1 Seminar for Global Engineering F1 Seminar for Global Engineering S2 Seminar for Global Engineering F2 A total of 8 credits, 2 credits each from the above courses.		24 credits	A,B,C,D,E	
	Research-related courses				D,E	
	Major courses	Project Design & Management S Project Design & Management F A total of 4 credits, 2 credits each from the above courses.	12 credits		A,B,C,D,E	
	Major courses and Research-related courses <u>outside</u> the Graduate Major in Global Engineering for Development, Environment and Society standard curriculum				B,C	

Total required credits	**A minimum of 30 credits including those attained according to the above conditions**
Note	**・Japanese Language and Culture Courses offered to international students can be recognized as equivalent to the Humanities and Social Science Courses of the corresponding course level.** **・For details of the Liberal Arts and Basic Science Courses, please refer to the relevant sections.**

5. IGP Courses

Table M2 shows the Core Courses of the Master's Degree Program in this major. Graduate Majors listed in the Comments column offer core courses that are recognized as equivalent to the corresponding Major Courses or Research-related Courses in the standard curriculum of this major.

Table M2. Core Courses of the Graduate Major in Global Engineering for Development, Environment and Society

Course category		Course number	Course title			Credits	Competencies	Learning goals	Comments
Research seminars	400 level	GEG.Z491.R	◎		Seminar for Global Engineering S1	0-2-0	2,3,5	A,B,C,D,E	
		GEG.Z492.R	◎		Seminar for Global Engineering F1	0-2-0	2,3,5	A,B,C,D,E	
	500 level	GEG.Z591.R	◎		Seminar for Global Engineering S2	0-2-0	2,3,5	A,B,C,D,E	
		GEG.Z592.R	◎		Seminar for Global Engineering F2	0-2-0	2,3,5	A,B,C,D,E	
Major courses	400 level	GEG.E401.L		□	Global Environmental System and Ecosystem Dynamics	2-0-0	3,4,5	A,B	
		GEG.E402.L		□	Urban Environment	2-0-0	3,5	A,B,D	
		GEG.E403.L		□	Environmental Cleanup and Pollution Control Technology	1-0-0	1,3	A,B,C	
		GEG.E404.L		□	Technologies for Energy and Resource Utilization	1-0-0	1,2,3	A,C,D	
		GEG.E411.L		□	Atmospheric Environment in Megacities	2-0-0	3	A,B,C	
		GEG.E412.L		□	Hydrology and Water Resources Conservation	2-0-0	1,3	A,B	
		GEG.E421.L			Energy & Environment-1	1-0-0	2,3,5	A,B,E	
		GEG.I401.L		□	Sustainable Development and Integrated Management	1-0-0	2,3,4,5	A,C,E	
		GEG.I402.L		□	Development Economics and Appropriate Technology	2-0-0	1,2,3,4	A,B	

		GEG.P451.R	◎		Project Design & Management S	0-1-1	1,2,5	B,C,E	
		GEG.P452.R	◎		Project Design & Management F	0-1-1	1,2,4,5	B,C,E	
		GEG.S401.L		□	Environmental Policy	1-0-0	1,3,4	A,B	
		GEG.S402.L		□	The economics and systems analysis of environment, resources and technology	1-0-0	3,4,5	A,B	
		GEG.S411.L		□	Global Science Communication and Engagement	1-1-0	1,2,4	B,C	
		GEG.T412.L		□	Chemical Process Synthesis for Development	2-0-0	1,3,5	A,C	
		GEG.T413.L		□	Basic Behaviormetrics: Theory and Methods	2-0-0	3,5	A,B	
	500 level	GEG.E501.L		□	Environmental Impact Assessment	1-0-0	3	A,B	
		GEG.E502.L		□	Environmental Hydraulics	1-0-0	3	A,B	
		GEG.E511.L		□	Socio-ecological systems in changing global and local environments	2-0-0	3,4,5	A,B	
		GEG.E512.L		□	Utilization of Resources and Wastes for Environment	1-0-0	1,3,4,5	A,B	
		GEG.I501.L		□	Coastal Disaster Mitigation for Engineers and Planners	1-0-0	1,3,5	A,B,C	
		GEG.I511.L		□	Case Method for International Development and Human Resources	1-0-0	2,3,4,5	A,C,E	
		GEG.P501.L		□	Concept Designing	2-0-0	2,4,5	B,C	
		GEG.P502.L		□	Project Management and Evaluation for Sustainable Infrastructure	2-0-0	3,4,5	A,B,C	
		GEG.E513.L	O	□	Landscape Ecology	1-0-0	3,5	A	
		GEG.S501.L		□	History and Current Issues of Economic Development and Environmental Protection	1-0-0	1,2,4,5	B, C, E	
		GEG.T501.L		□	Introduction to Information and Communication Technologies for Development	1-0-0	3	A,B	
		GEG.T502.L		□	Perspective and Understanding of Various Kinds of Material and Standardization	1-0-0	1	A,B	
		GEG.T503.L		□	Introduction to Systems Engineering	1-0-0	2,5	B	

		GEG.F541.L			Global Engineering Fieldwork A	0-0-1	1,2,4,5	C,E	
		GEG.F542.L			Global Engineering Fieldwork B	0-0-1	1,2,4,5	C,E	
		GEG.F543.L			Global Engineering Fieldwork C	0-0-1	1,2,4,5	C,E	
		GEG.F544.L			Global Engineering Fieldwork D	0-0-1	1,2,4,5	C,E	
		GEG.F551.L			Global Engineering Internship A	0-0-2	1,2,4,5	C,E	
		GEG.F552.L			Global Engineering Internship B	0-0-2	1,2,4,5	C,E	
		GEG.F553.L			Global Engineering Internship C	0-0-2	1,2,4,5	C,E	
		GEG.F554.L			Global Engineering Internship D	0-0-2	1,2,4,5	C,E	
		GEG.F531.L			Global Engineering International Workshop A (Master course)	0-0-1	2,3	D,E	
		GEG.F532.L			Global Engineering International Workshop B (Master course)	0-0-1	2,3	D,E	
		GEG.F533.L			Global Engineering International Workshop C (Master course)	0-0-1	2,3	D,E	
		GEG.F534.L			Global Engineering International Workshop D (Master course)	0-0-1	2,3	D,E	

Note：

• ◎：Required course, ○：Restricted elective, O：odd academic years, E：even academic years

• □：Course recognized as equivalent to that of the Academy for Co-creative Education of Environment and Energy Science (ACEEES).

• Competencies: 1 = Intercultural skills; 2 = Communication skills; 3 = Specialist skills; 4 = Critical thinking skills; 5 = Practical and/or problem-solving skills

• 【 】Course offered by another graduate major

• The character preceding the three digits in the course number denotes the course's subdiscipline (i.e., "D" represents the subdiscipline code in the course number ABC.D400.R): P (Project), E (Environment), S (Social environmental policy), I (International development), T (Technology), F (Fieldwork, internship), L (Lecture method).

6. IGP Courses That Can Be Counted as Humanities and Social Science Courses

None

7. IGP Courses That Can Be Counted as Career Development Courses

In order to fulfill the completion requirements for the master's degree program, students must attain at least 2 credits in Career Development Courses, and should satisfy all of the Graduate Attributes (GA) specified in Table MA-1 of the "Career Development Courses" (Liberal Arts and Basic Science Courses) in the Guide to Graduate Education and International Graduate

Program. Students will be evaluated in regards to GA achievements at the time of their degree completion. As to the courses with more than one GA, the number of GA stipulated for the courses is considered to be acquired regardless of the credits received for the courses.

Major Courses that enable students to acquire GA and that are recognized as equivalent to Career Development Courses are listed in Table M3 below.

However, it must be noted that credits attained from these courses cannot be counted more than once as Major Courses or Career Development Courses towards the completion requirements for the master's degree program.

For Graduate Attributes, refer to the Guide to the Career Development Courses.
The Graduate Attributes of the Master's Degree Program are listed in Table MA-1 as follows:

C0M: Able to delineate one's career plan clearly and recognize the skills necessary to materialize the plan, also considering its relations to the society

C1M: Able to utilize its own expertise to the development of academia and technology, and work with others with different expertise to contribute to problem-solving

Table M3. Courses of the Graduate Major in Global Engineering for Development, Environment and Society recognized as equivalent to Career Development Courses

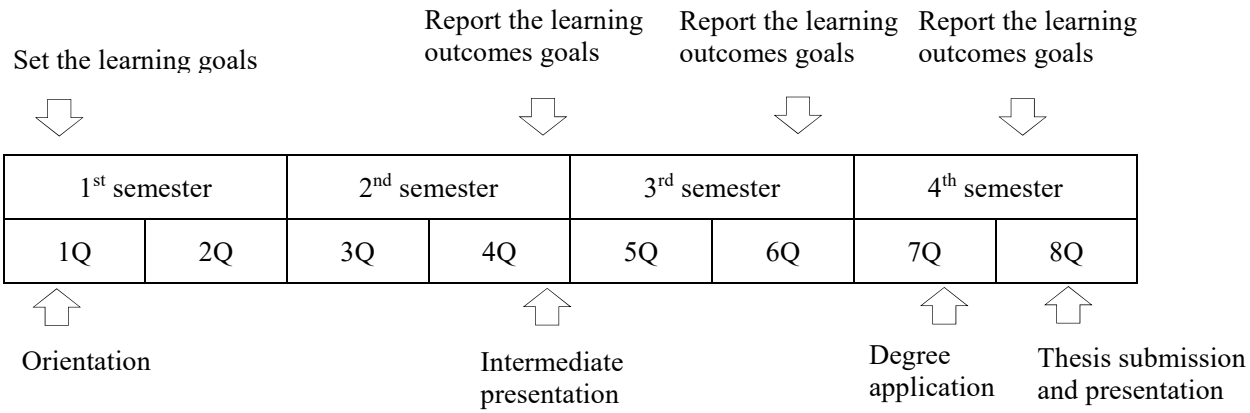
Course category	Course number	Course title	Credits	GA*	Learning goals	Comments
Courses that can be counted as Career Development Courses	GEG.F541.L - 544L	Global Engineering Fieldwork A, B, C, D	0-0-1	C1M	C,E	
	GEG.F551.L - 554.L	Global Engineering Internship A, B, C, D	0-0-2	C1M	C,E	
	GEG.F531.L - 534.L	Global Engineering International Workshop A, B, C, D (Master course)	0-0-1	C1M	D,E	

Credits in Career Development Courses must be attained from among the above-listed courses and those listed as such in the Liberal Arts and Basic Science Courses Guide.

＊GA: Graduate Attributes

8. Research Related to the Completion of Master Theses

Through the Master's thesis research, students shall experience a series of research processes and improve problem solving and communications skills. The timeline of the Master's thesis research is shown below. The items in the upper and lower lines of the table will be conducted in each laboratory and through the course, respectively.



- Establishing learning objectives and intermediate presentation

Establishing learning objectives (in each laboratory) and orientation (in the course) will be done in 1Q. Both will be geared toward understanding the student's career objectives, as well as his or her research background and the purpose of the research. Requisite intermediate presentations shall be conducted in 4Q. Teaching staff will evaluate students' progress toward learning objectives. When necessary, their goals and/or the content will be revised for the completion of the Master's thesis.

- Examination criteria for the Master's thesis

The Master's thesis shall be an original composition. It must contain the original discussion with new findings in a field of global engineering for development, environment, and society, or useful findings contributing to the development of science and engineering.

- Implementation of the thesis examination

The Master's thesis panel shall consist of a minimum of three judges. The student who want to proceed to the doctor course will be examined by five judges. After the preliminary review of the thesis by the judges, the candidate shall have an oral presentation, conducted entirely in English.

【Doctoral Degree Program】

1. Outline

The educational program aims to develop the human resource with an accurate understanding of the framework of science and engineering. The program follows on from the Master's degree course without being biased towards the framework of the system, facilitating the solution of complex problems faced by the international society, as well as the creation of new technology, value, and concept required in the society.

Science and technology have developed dramatically through the advancement, specialization, and subdivision of the existing academic disciplines. Further, the world has shrunk rapidly through the spread of globalization. However, complex problems such as global environmental issues have plagued the international society and cannot be solved by simply integrating each elemental technology. Furthermore, a change in the industrial structure has been accelerated by the maturation of the industry and society of developed countries, including ours. Creation of a new technology, value, and concept that offer a new perspective without being biased towards the framework of the existing academic system is urgently required.

The aim of the educational program is to build the ability to (1) create a new technology, value, and concept required in the society and (2) solve the numerous problems faced by the international society with an accurate understanding, without being biased towards the framework of the existing academic system, to cope with the above social change. Moreover, the education aims to equip global engineers with the "ability to co-create" including communication skills to work effectively in cooperation with an engineer from a different field and management skills to operate multiple projects or an organization.

2. Competencies Developed

In this program, students will acquire the following skills, which are more advanced than in the Master's degree course:

In this program, students will acquire the following skills:

I. Fundamental ability applicable to diverse related fields
- Theoretical and mathematical ability to think and analyze
- Ability to understand physical and natural phenomena
- Ability to use measurement and calculation technology for general purpose

II. Application ability without being biased towards the framework of the existing academic system
- Ability to solve a problem using an appropriate method
- Ability to plan, propose, and examine the new technology, value, and concept
- Ability to design and operate a system

III. Global Engineering Skills
- Ability to work in international cooperation (communication and presentation)
- Social responsibility and sense of ethics
- Self-deployment skills (autonomy and ability to take action)

3. Learning Goals

The department offers the educational program for the following purposes to allow students to master the above-mentioned skills:

A) Acquire the basic academic skills to specialize in the field of global engineering for development, environment, and society (to master I):

By acquiring the basic academic skills to specialize in the field of global engineering for development, environment, and society, students will find out the problem and improve their understanding of the methodology to solve it.

B) Acquire the academic skills in the diverse fields related to global engineering for development, environment, and society (to master I and II)

Students will acquire not only the academic skills of one specialized field but also the interdisciplinary academic skills across several related fields.

C) Acquire the ability to find out and solve the problem by themselves (to master II and III)

Acquire and develop the practical skills to solve a problem through lecture and practice on a social, environmental, and international project while complying with engineer's ethics

D) Acquire the ability to understand and systematize the latest trend in the research field (to master II and III)

Students will develop research abilities to systematize studies conducive to the development of the specialized field. They will understand the relevance and contribution of one's own studies as well as the latest research trend in the field.

E) Acquire practical international communication skills (to master III)

Students will cultivate communication skills in the mixed educational environment in laboratories that includes both Japanese and foreign students. In addition, students will acquire the practical skills to work in international cooperation through practical experience including international internship.

4. IGP Completion Requirements

The following requirements must be met to complete the Doctoral Degree Program of this major.

1. Attain a total of 24 credits or more from 600-level courses.
2. Fulfill requirements in Table D1 below.
3. Pass the doctoral thesis review and defense.

Table D1 shows course categories and the number of credits required to complete the Doctoral Degree Program of this major. It also shows the required minimum credits in each course category and points to be noted when selecting the required courses and electives.

The learning goals to be obtained by students through courses are listed as "associated learning goals". Prior to registering courses, students need to fully understand the course goals.

Table D1. Graduate Major in Global Engineering for Development, Environment and Society Completion Requirements

Course category		<Required courses> Required credits	<Electives> Minimum credits required	Minimum credits required	Associated learning goals	Comments
Liberal arts and basic science courses	Humanities and social science courses		2 credits	6 credits	C	
	Career development courses		4 credits		C,D,E	All Graduate Attributes (GA) should be acquired. (Refer to Section 7 for the definition of GA.)
	Other courses					
Core courses	Research seminars	Seminar for Global Engineering S3 Seminar for Global Engineering F3 Seminar for Global Engineering S4 Seminar for Global Engineering F4 Seminar for Global Engineering S5 Seminar for Global Engineering F5 A total of 12 credits, 2 credits each from the above courses.		18 credits	A,B,C,D,E	
	Research-related courses				D,E	
	Major courses				A,B,C,D,E	
Total required credits		**A minimum of 24 credits including those attained according to the above conditions**				
Note		**・Japanese Language and Culture Courses offered to international students can be recognized as equivalent to the Humanities and Social Science Courses of the corresponding course level.** **・For details of the Liberal Arts and Basic Science Courses, please refer to the relevant sections.**				

5. IGP Courses

Table D2 shows the Core Courses of the Doctoral Degree Program of this major. Graduate Majors listed in the Comments column offer core courses that are recognized as equivalent to the corresponding Major Courses or Research-related Courses in the standard curriculum of this major.

Table D2. Core Courses of the Graduate Major in Global Engineering for Development, Environment and Society

Course category		Course number	Course title			Credits	Competencies	Learning goals	Comments
Research seminars	600 level	GEG.Z691.R	◎		Seminar for Global Engineering S3	0-2-0	2,3,4,5	A,B,C,D,E	
		GEG.Z692.R	◎		Seminar for Global Engineering F3	0-2-0	2,3,4,5	A,B,C,D,E	
		GEG.Z693.R	◎		Seminar for Global Engineering S4	0-2-0	2,3,4,5	A,B,C,D,E	
		GEG.Z694.R	◎		Seminar for Global Engineering F4	0-2-0	2,3,4,5	A,B,C,D,E	
		GEG.Z695.R	◎		Seminar for Global Engineering S5	0-2-0	2,3,4,5	A,B,C,D,E	
		GEG.Z696.R	◎		Seminar for Global Engineering F5	0-2-0	2,3,4,5	A,B,C,D,E	
Research-related courses	600 level	GEG.L631.L			Advanced Theory of Teaching Method 1A	0-1-1	2,5	A,B	
		GEG.L632.L			Advanced Theory of Teaching Method 1B	0-1-1	2,5	A,B	
		GEG.L633.L			Advanced Theory of Teaching Method 1C	0-1-1	2,5	A,B	
		GEG.L634.L			Advanced Theory of Teaching Method 1D	0-1-1	2,5	A,B	
		GEG.L635.L			Advanced Theory of Teaching Method 2A	0-1-1	2,5	A,B	
		GEG.L636.L			Advanced Theory of Teaching Method 2B	0-1-1	2,5	A,B	
		GEG.L637.L			Advanced Theory of Teaching Method 2C	0-1-1	2,5	A,B	
		GEG.L638.L			Advanced Theory of Teaching Method 2D	0-1-1	2,5	A,B	
		GEG.L639.L			Advanced Theory of Teaching Method 3A	0-1-1	2,5	A,B	
		GEG.L640.L			Advanced Theory of Teaching Method 3B	0-1-1	2,5	A,B	
		GEG.L641.L			Advanced Theory of Teaching Method 3C	0-1-1	2,5	A,B	

		GEG.L642.L			Advanced Theory of Teaching Method 3D	0-1-1	2,5	A,B	
		GEG.F651.L			Practice in Company 1A (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F652.L			Practice in Company 1B (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F653.L			Practice in Company 1C (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F654.L			Practice in Company 1D (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F655.L			Practice in Company 2A (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F656.L			Practice in Company 2B (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F657.L			Practice in Company 2C (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F658.L			Practice in Company 2D (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F659.L			Practice in Company 3A (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F660.L			Practice in Company 3B (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F661.L			Practice in Company 3C (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.F662.L			Practice in Company 3D (Global Engineering)	0-1-1	3,5	B,C,D	
		GEG.P651.L			Advanced Theory of Co-creation 1A	0-1-1	2,4,5	C,D,E	
		GEG.P652.L			Advanced Theory of Co-creation 1B	0-1-1	2,4,5	C,D,E	
		GEG.P653.L			Advanced Theory of Co-creation 1C	0-1-1	2,4,5	C,D,E	
		GEG.P654.L			Advanced Theory of Co-creation 1D	0-1-1	2,4,5	C,D,E	
		GEG.P655.L			Advanced Theory of Co-creation 2A	0-1-1	4,5	C,D,E	
		GEG.P656.L			Advanced Theory of Co-creation 2B	0-1-1	4,5	C,D,E	
		GEG.P657.L			Advanced Theory of Co-creation 2C	0-1-1	4,5	C,D,E	
		GEG.P658.L			Advanced Theory of Co-creation 2D	0-1-1	4,5	C,D,E	
		GEG.P659.L			Advanced Theory of Co-creation 3A	0-1-1	4,5	C,D,E	

		GEG.P660.L			Advanced Theory of Co-creation 3B	0-1-1	4,5	C,D,E	
		GEG.P661.L			Advanced Theory of Co-creation 3C	0-1-1	4,5	C,D,E	
		GEG.P662.L			Advanced Theory of Co-creation 3D	0-1-1	4,5	C,D,E	
		GEG.P631.L			Global Engineering Off-Campus Project 1A	0-0-1	1,2,4,5	C,D,E	
		GEG.P632.L			Global Engineering Off-Campus Project 1B	0-0-1	1,2,3,4,5	C,D,E	
		GEG.P633.L			Global Engineering Off-Campus Project 1C	0-0-1	1,2,4,5	C,D,E	
		GEG.P634.L			Global Engineering Off-Campus Project 1D	0-0-1	1,2,4,5	C,D,E	
		GEG.P635.L			Global Engineering Off-Campus Project 2A	0-0-1	1,2,4,5	C,D,E	
		GEG.P636.L			Global Engineering Off-Campus Project 2B	0-0-1	1,2,4,5	C,D,E	
		GEG.P637.L			Global Engineering Off-Campus Project 2C	0-0-1	1,2,4,5	C,D,E	
		GEG.P638.L			Global Engineering Off-Campus Project 2D	0-0-1	1,2,4,5	C,D,E	
		GEG.P639.L			Global Engineering Off-Campus Project 3A	0-0-1	1,2,4,5	C,D,E	
		GEG.P640.L			Global Engineering Off-Campus Project 3B	0-0-1	1,2,4,5	C,D,E	
		GEG.P641.L			Global Engineering Off-Campus Project 3C	0-0-1	1,2,4,5	C,D,E	
		GEG.P642.L			Global Engineering Off-Campus Project 3D	0-0-1	1,2,4,5	C,D,E	
		GEG.F631.L			Global Engineering International Workshop 1A (Doctor course)	0-0-1	2,3	D,E	
		GEG.F632.L			Global Engineering International Workshop 1B (Doctor course)	0-0-1	2,3	D,E	
		GEG.F633.L			Global Engineering International Workshop 1C (Doctor course)	0-0-1	2,3	D,E	
		GEG.F634.L			Global Engineering International Workshop 1D (Doctor course)	0-0-1	2,3	D,E	
		GEG.F635.L			Global Engineering International Workshop 2A (Doctor course)	0-0-1	2,3	D,E	
		GEG.F636.L			Global Engineering International Workshop 2B (Doctor course)	0-0-1	2,3	D,E	
		GEG.F637.L			Global Engineering International Workshop 2C (Doctor course)	0-0-1	2,3	D,E	

		GEG.F638.L			Global Engineering International Workshop 2D (Doctor course)	0-0-1	2,3	D,E	
		GEG.F639.L			Global Engineering International Workshop 3A (Doctor course)	0-0-1	2,3	D,E	
		GEG.F640.L			Global Engineering International Workshop 3B (Doctor course)	0-0-1	2,3	D,E	
		GEG.F641.L			Global Engineering International Workshop 3C (Doctor course)	0-0-1	2,3	D,E	
		GEG.F642.L			Global Engineering International Workshop 3D (Doctor course)	0-0-1	2,3	D,E	
Major courses	**600 level**	GEG.P671.L			Sustainable Engineering Program Off-Campus Project (GEDES) S	0-0-4	1,2,3,4,5	C,D,E	For IGP(A) (ISSEP) students only
		GEG.P672.L			Sustainable Engineering Program Off-Campus Project (GEDES) F	0-0-4	1,2,3,4,5	C,D,E	For IGP(A) (ISSEP) students only

Note：

- ◎：Required course，○：Restricted elective，O：odd academic years，E：even academic years
- □：Course recognized as equivalent to that of the Academy for Co-creative Education of Environment and Energy Science (ACEEES).
- Competencies: 1 = Intercultural skills; 2 = Communication skills; 3 = Specialist skills; 4 = Critical thinking skills; 5 = Practical and/or problem-solving skills
- 【 】Course offered by another graduate major
- The character preceding the three digits in the course number denotes the course's subdiscipline (i.e., "D" represents the subdiscipline code in the course number ABC.D600.R): P (Project), E (Environment), S (Social environmental policy), I (International development), T (Technology), F (Fieldwork, internship), L (Lecture method).

6. IGP Courses That Can Be Counted as Humanities and Social Science Courses

None

7. IGP Courses That Can Be Counted as Career Development Courses

In order to fulfill the completion requirements for the doctoral degree program, students must attain at least 4 credits in Career Development Courses, and should satisfy all of the Graduate Attributes (GA) specified in Table A-1 or A-2 of the “Career Development Courses” (Liberal Arts and Basic Science Courses) in the Guide to Graduate Education and International Graduate Program. Students will be evaluated in regards to GA achievements at the time of their degree completion. As to the courses with more than one GA, the number of GA stipulated for the courses is considered to be acquired regardless of the credits received for the courses.

Major Courses that enable students to acquire GA and that are recognized as equivalent to Career Development Courses are listed in Tables D3-1 and D3-2 below.

However, it must be noted that credits attained from these courses cannot be counted more than once as Major Courses or Career Development Courses towards the completion requirements for the doctoral degree program.

For Graduate Attributes, refer to the Guide to the Career Development Courses.

The Graduate Attributes of the Academic Leader Program (ALP) are listed in Table A-1 as follows:

A0D: You will be able to precisely draw your own career plan and self-train yourself to acquire the skills required for attaining your goals in the academic field

A1D: You will be able to ascertain the true nature of phenomena, master the secret of learning, and lead the pioneering of a new academic discipline or research area

A2D: You will be able to understand the position of academia in society, and adequately explain the academic progress to members of society, which is the stakeholder

A3D: You will be able to nurture junior students in educational institutions, inculcating in them an interest in academics and enabling them to later join in the pioneering of new academic disciplines or research areas

The Graduate Attributes of the Productive Leader Program (PLP) are listed in Table A-2 as follows:

P0D: You will be able to precisely draw your own career plan and self-train yourself to acquire the skills required for attaining your goals in the industry, etc.

P1D: You will be able to precisely grasp the needs of society and detect its problems, and lead the future developments in science and technology

P2D: While leading teams consisting of members with varied specialties and value systems, you will be able to create products and enterprises that bring forth new values in the society

P3D: Through the project, you will be able to nurture junior students, enabling them to later join in the development of next generation society and industry

Table D3-1. Courses of the Graduate Major in Global Engineering for Development, Environment and Society recognized as equivalent to Career Development Courses in the Academic Leader Program (ALP)

Course category	Course number	Course title			Credits	GA*	Learning goals	Comments
Courses that can be counted as Career Development Courses	GEG.L631.L-642.L			Advanced Theory of Teaching Method 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-1-1	A2D, A3D	A,B	
	GEG.F651.L-662.L			Practice in Company (Global Engineering) 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-1-1	A2D, A3D	B,C,D	
	GEG.P651.L-662.L			Advanced Theory of Co-creation 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-1-1	A2D, A3D	C,D,E	
	GEG.P631.L-642.L			Global Engineering Off-Campus Project (Global Engineering) 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-0-1	A2D, A3D	C,D,E	
	GEG.F631.L-642.L			Global Engineering International Workshop (Doctor course) 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-0-1	A2D, A3D	D,E	
	GEG.P671.L, GEG.P672.L			Sustainable Engineering Program Off-Campus Project (GEDES) S,F	0-0-4	A2D, A3D	C,D,E	
Credits in Career Development Courses must be attained from among the above-listed courses and those listed as such in								

the Liberal Arts and Basic Science Courses Guide.

＊GA: Graduate Attributes

Table D3-2. Courses of the Graduate Major in Global Engineering for Development, Environment and Society recognized as equivalent to Career Development Courses in the Productive Leader Program (PLP)

Course category	Course number	Course title	Credits	GA*	Learning goals	Comments
Courses that can be counted as Career Development Courses	GEG.F651.L-662.L	Practice in Company (Global Engineering) 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-1-1	P2D, P3D	B,C,D	
	GEG.P651.L-662.L	Advanced Theory of Co-creation 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-1-1	P2D, P3D	C,D,E	
	GEG.P631.L-642.L	Global Engineering Off-Campus Project 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-0-1	P2D, P3D	C,D,E	
	GEG.F631.L-642.L	Global Engineering International Workshop (Doctor course) 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D	0-0-1	P2D, P3D	D,E	
	GEG.P671.L, GEG.P672.L	Sustainable Engineering Program Off-Campus Project (GEDES) S,F	0-0-4	P2D, P3D	C,D,E	

Credits in Career Development Courses must be attained from among the above-listed courses and those listed as such in the Liberal Arts and Basic Science Courses Guide.

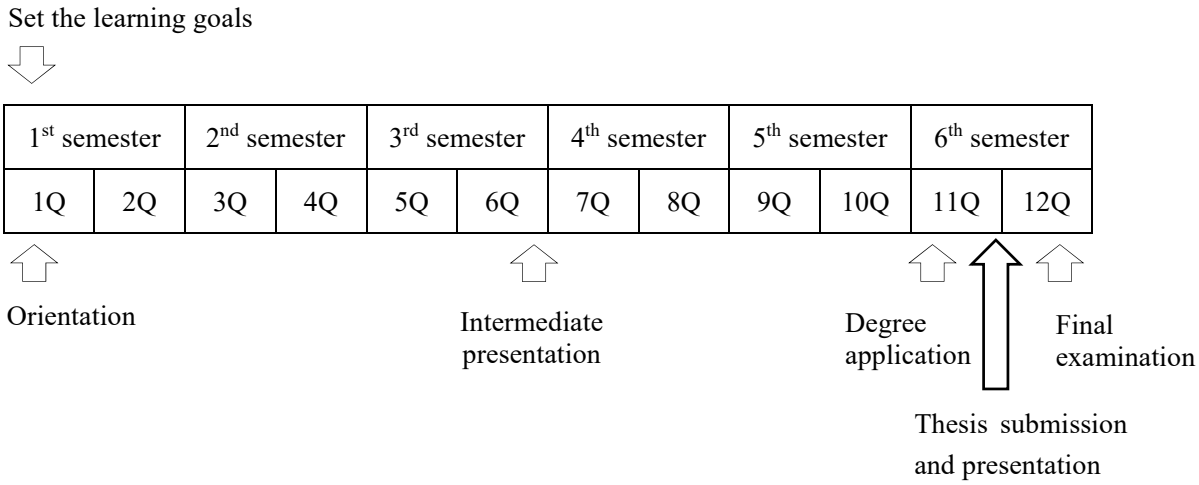
＊GA: Graduate Attributes

Students enrolled in the educational program for leading graduate schools or in the Tokyo Tech Academy for Leadership (ToTAL) may be offered courses recognized as equivalent to Career Development Courses besides those listed as such in the “Liberal Arts and Basic Science Courses” in the Guide to Graduate Education and International Graduate Program. For details about available courses or completion requirements, please refer to the Study Guide of the Academy that offers the relevant program.

8. Research Related to the Completion of Doctoral Theses

The doctoral thesis research process fosters the ability to find and solve problems and improves English communication skills. These competencies will be acquired through setting and evaluating learning objectives.

The doctoral thesis research timeline is shown below. The items on the upper and lower lines of the table will be conducted in each laboratory and through the course, respectively.



- Examination criteria for the doctoral thesis

The doctoral thesis shall be an original dissertation with rigorous academic values in a field of global engineering for development, environment, and society. The major part of the thesis shall be published, or written at an acceptable level for publication, in qualified academic journals.

- Implementation of the thesis examination

The doctoral thesis panel shall consist of a minimum of five judges. After a candidate passes the preliminary examination, he or she shall submit the thesis and conduct an oral presentation, entirely in English. Then, the thesis shall be reviewed by judges and the candidate shall proceed to the final examination/evaluation. For the phase, the candidate's English aptitude and comprehension of the research field shall be tested.