Graduate Major in Architecture and Building Engineering

【Master's degree program】

1. Outline

Our Department of Architecture and Building Engineering at Tokyo Tech originated in 1907 as part of the curriculum at Tokyo Tech's parent institution Tokyo Technical High School (i.e., Technische Hochschule) founded in 1881. The department is therefore one of the oldest university-level architectural schools in Japan. With its one-hundred-year history it enjoys a high reputation both within and outside Japan, a number of its graduates having become renowned architects, structural engineers or academics. This **International Graduate Program** is solely for master's and doctoral students and is administered chiefly by the **Architectural Design Course** of the department. (NB: all Japanese architectural degrees are conferred in the form of an engineering qualification.)

2. Competencies Developed

The major concentration in this course is within architectural design (studio courses) and history and theory, with fieldwork broaching new architectural themes in an urban context.

3. Learning Goals

Requisite instruction to better understand Japanese megacities and the built environment throughout Japan will be offered in seminars that also include architectural tours. Instructors will assist and encourage students seeking to master these themes, and each student will be required to obtain 34 credits over two years of study and complete either a design diploma— or a written thesis in English— at the end of the second year.

For the Master's degree of Architecture and Building Engineering, students engage in the following program of study:

A) Specialized Basic Studies in the Field of Architecture

Selective semi-compulsory subjects of architecture studies. Studies and applications of urban / environmental engineering, engineering design by selectable recommended subjects.

B) Application study of architecture

Study to learn application of the theory by abundant specialized elective subjects based on acquiring specialized basic subjects.

C) Fostering a broad perspective and learning subjectively

Students are given the ability to study on their own initiative through research seminars, practice, experiment, periodic orientation, teaching face to face with special consultation faculty.

D) Study to pursue relationship with society

Lecturers active in society and practical experience learning through internship subjects and learning of engineer ethics

E) Enhancement of communication skills

Bibliographical documentation capabilities required to prepare papers for research on specific subjects, training on presentation skills through seminars, workshops, international conferences, etc.

4. IGP Completion Requirements

【Master’s degree】

・Attain a total of 34 credits or more from 400- and 500-level courses.

・Fulfill requirements in Table M1 below.

・Pass the master's thesis examination and the final examination.

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 Architecture and Building Engineering 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, E	All Graduate Attributes (GA) should be acquired. (Refer to Section 7 for the definition of GA.)
	Other courses				C	
Core courses	**Research seminars**	Research Seminar in Architecture and Building Engineering S1 Research Seminar in Architecture and Building Engineering F1 Research Seminar in Architecture and Building Engineering S2 Research Seminar in Architecture and Building Engineering F2 A total of 8 credits, 2 credits each from the above courses.		20 credits	C	
	Research-related courses				D	
	Major courses		12 credits		A, B, C, E	
	Major courses and Research-related courses <u>outside</u> the Graduate Major in Architecture and Building Engineering			2 credits	C	

	standard curriculum					
Total required credits		**A minimum of 34 credits including those attained according to the above conditions**				
Note		**・For Research-related courses, credits earned in excess of 2 credits are not included in the 34-Total required credits. However, Research-related courses outside the Graduate Major in Architecture and Building Engineering are excluded.** **・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.**				

The minimum period of study is two years in total. Note that the above requirements are minimal and some additional requirements may be conditioned depending on the special course. All students are strongly advised to consult with their own supervisors about the study plan.

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 Architecture and Building Engineering

Course category		**Course number**	**Course title**			**Credits**	**Competencies**	**Learning goals**	**Comments**
Research seminars	**400 level**	ARC.Z491.R	◎		Seminar in Architecture and Building Engineering S1	0-2-0	1,3,5	C	
		ARC.Z492.R	◎		Seminar in Architecture and Building Engineering F1	0-2-0	1,3,5	C	
	500 level	ARC.Z591.R	◎		Seminar in Architecture and Building Engineering S2	0-2-0	1,3,5	C	
		ARC.Z592.R	◎		Seminar in Architecture and Building Engineering F2	0-2-0	1,3,5	C	
Research-related courses	**400 level**	ARC.A405.L			Architectural Design Practice S1A	0-0-2	1,3,5	D	
		ARC.A406.L			Architectural Design Practice S1B	0-0-4	1,3,5	D	
		ARC.A407.L			Architectural Design Practice F1A	0-0-2	1,3,5	D	
		ARC.A408.L			Architectural Design Practice F1B	0-0-4	1,3,5	D	
	500 level	ARC.A505.L			Architectural Design Practice S2A	0-0-2	1,3,5	D	
		ARC.A506.L			Architectural Design Practice S2B	0-0-4	1,3,5	D	
		ARC.A507.L			Architectural Design Practice F2A	0-0-2	1,3,5	D	
		ARC.A508.L			Architectural Design Practice F2B	0-0-4	1,3,5	D	

Major courses	**400 level**	ARC.S441.L	O		Dynamics of Structures	2-0-0	1,4,5	A,B	【Urban Design and Built Environment (UDE.S401)】
		ARC.S442.L			Nonlinear Behavior of Concrete and Concrete Members	2-0-0	1,2,5	A,B	【Urban Design and Built Environment (UDE.S402)】
		ARC.S444.L			Passive-control Structures and Base-isolated Structures against Earthquakes	2-0-0	1	A,B	【Urban Design and Built Environment (UDE.S404)】
		ARC.S445.L			Post-earthquake Damage Evaluation and Rehabilitation of Steel Structures	2-0-0	1,5	A,B	【Urban Design and Built Environment (UDE.S405)】
		ARC.A401.L			Exercise in Architectural Design and Planning S1	0-0-1	1,3,5	C	Not available for students who take Experiment on Building Engineering S1.
		ARC.A402.L			Exercise in Architectural Design and Planning F1	0-0-1	1,3,5	C	Not available for students who take Experiment on Building Engineering F1.
		ARC.A403.L			Experiment on Building Engineering S1	0-0-1	1,3,5	C	Not available for students who take Exercise in Architectural Design and Planning S1.
		ARC.A404.L			Experiment on Building Engineering F1	0-0-1	1,3,5	C	Not available for students who take Exercise in Architectural Design and Planning F1.
		ARC.D401.L			History of Architecture	2-0-0	2,3,4,5	A,B	
		ARC.D402.L			Architectural Preservation and Renovation	2-0-0	1,3,4,5	A,B	
		ARC.D403.L			Architectural Workshop 1	1-1-0	1,2	A,B	

		ARC.D404.L			Architectural Tour	0-0-1	1,2	A,B	
		ARC.D421.L			Architectural Design Studio I	0-2-0	1,2,3,5	A,B	
		ARC.D422.L			Architectural Design Studio II	0-2-0	1,2,3,5	A,B	
		ARC.D423.L			Architectural Design Studio III	0-2-0	1,2,3,4,5	A,B	
		ARC.D424.L			Theory of Architectural Space and Planning	1-1-0	1,3	A,B	
		ARC.D441.L			Passive Solar Design	2-0-0	1,2,3	A,B	
		ARC.D443.L			Structural Planning in Architecture	1-0-0	1,3,5	A,B	O
		ARC.D446.L			Theory of Architectural Design II	2-0-0	1,2,3,4,5	A,B	
		ARC.D447.L			Architectural Theory for Urban Space	2-0-0	1,3	A,B	
		ARC.D448.L			Environment Design in Japan	1-0-0	1,2,5	B	
		ARC.D462.L			Architectural Behaviorology2	1-1-0	1,2,3,4,5	A,B	
		ARC.E425.L	O		Evaluation and Design of Thermal Environment	1-0-0	1,4,5	A,B	
		ARC.P441.L			Theories in Urban Analysis and Planning I	2-0-0	1,2,3,4,5	A,B	
		ARC.P442.L	O		Theories in Urban Analysis and Planning II	2-0-0	1,2,5	A,B	
		ARC.S403.L	O		Advanced Course on Design of Prestressed Concrete Structure	2-0-0	1,5	A,B	
		ARC.S421.L	E		Applied Building Structural Design	2-0-0	1,2,3,4,5	A,B	
		ARC.A441.L			Interdisciplinary scientific principles of energy 1	1-0-0			【Energy Science and Engineering (ENR.A401)】
		ARC.A442.L			Interdisciplinary scientific principles of energy 2	1-0-0			【Energy Science and Engineering (ENR.A402)】
		ARC.A443.L			Interdisciplinary principles of energy devices 1	1-0-0			【Energy Science and Engineering (ENR.A403)】
		ARC.A444.L			Interdisciplinary principles of energy devices 2	1-0-0			【Energy Science and Engineering (ENR.A404)】
		ARC,A445.L			Marketing for Value Creation	1-0-0			【Academy of

									Energy and Informatics (ENI.H401)】
		ARC.A446.L			Finance and Data Analysis in Energy Markets	1-0-0			【Academy of Energy and Informatics (ENI.H402)】
		ARC.A447.L			Economic Development and Energy Policies	1-0-0			【Academy of Energy and Informatics (ENI.H403)】
		ARC.A448.L			Economy of energy system	1-0-0			【Energy Science and Engineering (ENR.A408)】
	500 level	ARC.S541.L			Disaster Mitigation for Building Structures	2-0-0	1,2,,5	A,B	【Urban Design and Built Environment (UDE.S501)】
		ARC.A501.L			Exercise in Architectural Design and Planning S2	0-0-1	1,3,5	C	Not available for students who take Experiment on Building Engineering S2.
		ARC.A502.L			Exercise in Architectural Design and Planning F2	0-0-1	1,3,5	C	Not available for students who take Experiment on Building Engineering F2.
		ARC.A503.L			Experiment on Building Engineering S2	0-0-1	1,3,5	C	Not available for students who take Exercise in Architectural Design and Planning S2.
		ARC.A504.L			Experiment on Building Engineering F2	0-0-1	1,3,5	C	Not available for students who take Exercise in Architectural Design and Planning F2.
		ARC.D521.L			Architectural Workshop 2	0-0-2	1,2,3,5	E	
		ARC.P501.L	O		Theories in Architectural Planning II	2-0-0	1,2,3,4,5	A,B	

Note：

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

• Competencies: 1 = Specialist skills, 2 = Liberal arts skills, 3 = Communication skills, 4 = Applied skills (inquisitive thinking and/or problem-finding skills), 5 = Applied skills (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): A (General), D (History and Design), P (Planning), S (Structure and Material), E (Environment and Equipment).

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 can be counted towards the completion requirements of master's degree program, either for the Major Courses or for the Career Development Courses (i.e., not for both). Nevertheless, even in the cases from those mentioned above where attained credits pertaining to these courses are not considered as Career Development Courses, their associated GAs are always considered to have been acquired.

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:

GA0M: You can clearly plan your own career and recognize the abilities necessary for realizing it while considering ethics and relevance to societal problems.

GA1M: You can acquire the knowledge, skills, and ethics necessary for realizing your planned career and contribute to societal problem-solving while collaborating with other experts

Table M3. Courses of the Graduate Major in Architecture and Building Engineering 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	ARC.A405.L			Architectural Design Practice S1A	0-0-2	GA1M	D	
	ARC.A406.L			Architectural Design Practice S1B	0-0-4	GA1M	D	

Development Courses	ARC.A407.L			Architectural Design Practice F1A	0-0-2	GA1M	D	
	ARC.A408.L			Architectural Design Practice F1B	0-0-4	GA1M	D	
	ARC.A505.L			Architectural Design Practice S2A	0-0-2	GA1M	D	
	ARC.A506.L			Architectural Design Practice S2B	0-0-4	GA1M	D	
	ARC.A507.L			Architectural Design Practice F2A	0-0-2	GA1M	D	
	ARC.A508.L			Architectural Design Practice F2B	0-0-4	GA1M	D	
	ARC.D521.L			Architectural Workshop 2	0-0-2	GA1M	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

Each student will be required to complete either a design diploma— or a written thesis in English— at the end of the second year.

【Doctoral degree program】

1. Outline

Our Department of Architecture and Building Engineering at Tokyo Tech originated in 1907 as part of the curriculum at Tokyo Tech's parent institution Tokyo Technical High School (i.e., Technische Hochschule) founded in 1881. The department is therefore one of the oldest university-level architectural schools in Japan. With its one-hundred-year history it enjoys a high reputation both within and outside Japan, a number of its graduates having become renowned architects, structural engineers or academics. This **International Graduate Program** is solely for master's and doctoral students and is administered chiefly by the **Architectural Design Course** of the department. (NB: all Japanese architectural degrees are conferred in the form of an engineering qualification.)

2. Competencies Developed

The major concentration in this course is within architectural design (studio courses) and history and theory, with fieldwork broaching new architectural themes in an urban context.

3. Learning Goals

Requisite instruction to better understand Japanese megacities and the built environment throughout Japan will be offered in seminars. Instructors will assist and encourage students seeking to master these themes, and each student will be required to obtain 24 credits over three years of study and complete a written thesis in English at the end of the third year.

For the Doctor's degree of Architecture and Building Engineering, students engage in the following program of study:

A) Study of special subjects in architectural field

In addition to the world-class advanced expertise in the field of research, a wide range of expertise as well as learning to acquire the ability to practice interdisciplinary.

B) Study to advance doctoral dissertation research

In addition to acquiring the ability to build and practice world-class research on its own in the research field, students writing a doctoral dissertation.

C) Study to acquire logical dialogue skills

Study to acquire the professional communication ability to be logical explanation, discussion, discussion based on advanced expertise as a leader in the future in the international activity.

4. IGP Completion Requirements

【Doctoral degree】

・Attain a total of 24 credits or more from 600-level courses.
・Fulfill requirements in Table D1 below.
・Pass the doctoral thesis examination and the final examination.

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 Architecture and Building Engineering 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	All Graduate Attributes (GA) should be acquired. (Refer to Section 7 for the definition of GA.)
	Other courses					
Core courses	Research seminars	Research Seminar in Architecture and Building Engineering S3 Research Seminar in Architecture and Building Engineering F3 Research Seminar in Architecture and Building Engineering S4 Research Seminar in Architecture and Building Engineering F4 Research Seminar in Architecture and Building Engineering S5 Research Seminar in Architecture and Building Engineering F5 A total of 12 credits, 2 credits each from the above courses.		12 credits	B	
	Research-related courses				C	
	Major courses				A	
	Major courses and Research-related courses <u>outside</u> the Graduate Major in Architecture and Building					

	Engineering standard curriculum					
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.**				

The minimum period of study is three years in total. Note that the above requirements are minimal and some additional requirements may be conditioned depending on the special course. All students are strongly advised to consult with their own supervisors about the study plan.

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 Architecture and Building Engineering

Course category		**Course number**	**Course title**			**Credits**	**Competencies**	**Learning goals**	**Comments**
Research seminars	**600 level**	ARC.Z691.R	◎		Seminar in Architecture and Building Engineering S3	0-2-0	1,2,3,4,5	B	
		ARC.Z692.R	◎		Seminar in Architecture and Building Engineering F3	0-2-0	1,2,3,4,5	B	
		ARC.Z693.R	◎		Seminar in Architecture and Building Engineering S4	0-2-0	1,2,3,4,5	B	
		ARC.Z694.R	◎		Seminar in Architecture and Building Engineering F4	0-2-0	1,2,3,4,5	B	
		ARC.Z695.R	◎		Seminar in Architecture and Building Engineering S5	0-2-0	1,2,3,4,5	B	
		ARC.Z696.R	◎		Seminar in Architecture and Building Engineering F5	0-2-0	1,2,3,4,5	B	
Research-related courses	**600 level**	ARC.A621.L			Architectural Design Practice S3A	0-0-2	1,3,4,5	C	
		ARC.A622.L			Architectural Design Practice S3B	0-0-4	1,3,4,5	C	
		ARC.A623.L			Architectural Design Practice F3A	0-0-2	1,3,4,5	C	
		ARC.A624.L			Architectural Design Practice F3B	0-0-4	1,3,4,5	C	

Major Courses	**600 level**	ARC.A601.L			Project in Architecture and Building Engineering S3・1	0-0-1	1,3,4,5	A	
		ARC.A602.L			Project in Architecture and Building Engineering S3・2	0-0-1	1,3,4,5	A	
		ARC.A603.L			Project in Architecture and Building Engineering F3・1	0-0-1	1,3,4,5	A	
		ARC.A604.L			Project in Architecture and Building Engineering F3・2	0-0-1	1,3,4,5	A	
		ARC.A605.L			Project in Architecture and Building Engineering S4・1	0-0-1	1,3,4,5	A	
		ARC.A606.L			Project in Architecture and Building Engineering S4・2	0-0-1	1,3,4,5	A	
		ARC.A607.L			Project in Architecture and Building Engineering F4・1	0-0-1	1,3,4,5	A	
		ARC.A608.L			Project in Architecture and Building Engineering F4・2	0-0-1	1,3,4,5	A	
		ARC.A641.L			InfoSyEnergy-outreach	0-0-1			【Academy of Energy and Informatics (ENI.A601)】
		ARC.A642.L			InfoSyEnergy-international forum 1	0-0-2			【Academy of Energy and Informatics (ENI.B611)】
		ARC.A643.L			InfoSyEnergy-international forum 2	0-0-2			【Academy of Energy and Informatics (ENI.B612)】
		ARC.A644.L			InfoSyEnergy-international forum 3	0-0-2			【Academy of Energy and Informatics (ENI.B613)】
		ARC.A645.L			InfoSyEnergy-joint research projects 1	0-0-2			【Academy of Energy and Informatics (ENI.C611)】
		ARC.A646.L			InfoSyEnergy-joint research projects 2	0-0-4			【Academy of Energy and Informatics (ENI.C612)】
		ARC.A647.L			InfoSyEnergy-international field work-short term	0-0-2			【Academy of Energy and Informatics (ENI.C616)】

		ARC.A648.L			InfoSyEnergy-international field work-long term	0-0-4			【Academy of Energy and Informatics (ENI.C617)】
		ARC.A625			Cooperative Education through Research Internships of Architecture and Building Engineering	0-0-4	1,3,4,5	A	

Note：

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

• Competencies: 1 = Specialist skills, 2 = Liberal arts skills, 3 = Communication skills, 4 = Applied skills (inquisitive thinking and/or problem-finding skills), 5 = Applied skills (practical and/or problem-solving skills)

• 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): Z (Research seminars).

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 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

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

GA0D: You can clearly design your own career and contribute to realizing scientific, technological, or social innovation through a comprehensive understanding of the knowledge, skills, social responsibilities and ethics required to become an active member of academia and/or industry.

GA1D: You can lead in realizing scientific, technological, or social innovation by acquiring the advanced leadership skills, entrepreneurial skills, knowledge and expertise, and by developing social responsibility necessary for materializing your designed career.

Students enrolled in the educational program for leading graduate schools, the Tokyo Tech Academy for Leadership (ToTAL) or WISE Programs 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.

Table D3. Courses of the Graduate Major in Architecture and Building Engineering 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	ARC.A625	Cooperative Education through Research Internships of Architecture and Building Engineering	0-0-4	1,3,4,5	A	
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 Doctoral Theses

Each student will be required to complete a written thesis in English at the end of the third year.