Academic Guidance and Orientation

International Program of Maritime and Urban Engineering

2022 October

Division of Global Architecture
Graduate School of Engineering
Osaka University

International Program of Maritime and Urban Engineering

Background

Observing natural disasters by huge earthquakes, associated big destructive tsunami, typhoon, and subsequent damage of nuclear power plants, we could recognize strongly the importance of safety and protection of local and global environments. These kinds of need from the society exist in densely-populated cities especially in Asian countries. Considering these, we realize that much effort should be made for the research and education on the following modern themes to be done in Maritime and Urban Engineering:

- Prevention and mitigation of natural disaster
- Protection of maritime and urban environment
- Development of renewable energy and energy-saving techniques
- Safety measures, risk assessment, new transportation system
- Synthesized design of space, ocean and land

Objectives in the International Special Program

What we are aiming to do in this international special program are as follows:

- Nurturing younger scientists who will be able to lead the academic society in the modern Maritime and Urban Engineering and succeed the knowledge to the next generation with relationship of mutual trust and partnership with Japan
- Establishment of international environment for both Japanese and international students for studying hard in friendly rivalry, by providing them with various opportunities of high-level and quality-emphasized academic interactions

Division of Global Architecture is in charge

Division of Global Architecture in the graduate school at Osaka University is comprised of three Departments: Naval Architecture & Ocean Engineering, Civil Engineering, and Architectural Engineering, covering research areas related to offshore, coastal, onshore and urban infrastructures, and also encompassing all kinds of mobility of ships, trains and automobiles.

Therefore, we are confident in our eligibility in directing and educating students on the technologies and theories requisite in the Maritime and Urban Engineering.

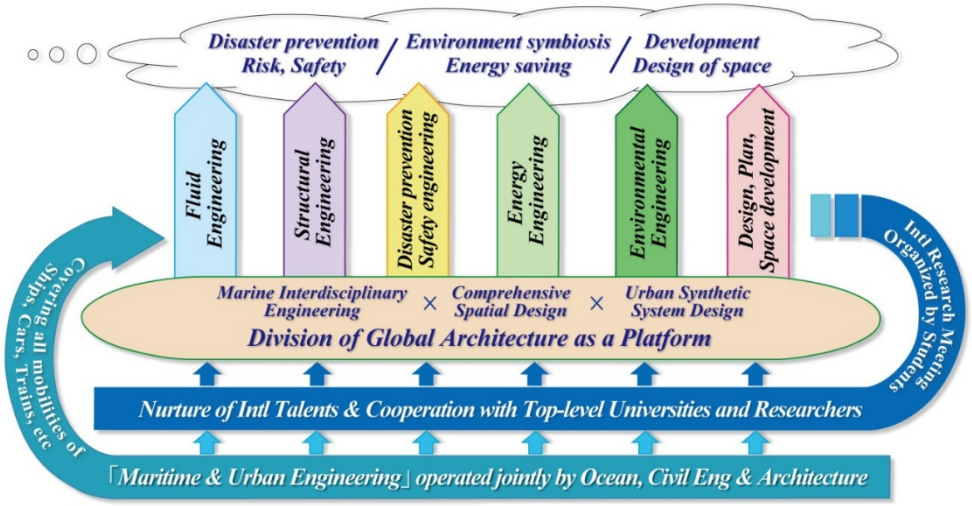

Fig. 1 Academic areas to be covered by the Division of Global Architecture

Common keywords:

Hydrodynamics, Structural strength, Disaster prevention, Safety engineering, Energy saving, Renewable energy, Transportation, Environmental symbiosis, Development and design of space, land and ocean, etc.

System in Education (Master's program)

An image of possible courses in taking lectures is shown next page. There are three systematic categories in elective lectures; that is, (1) Safety and Prevention of disaster, (2) Environmental symbiosis and Energy saving, and (3) Development and Design.

In addition, the students need take prerequisite (compulsory) subjects

Special Topics on Global Architecture and Exercise in Global Architecture
Exercises in Global Architecture
Internship in Global Architecture

These are prepared to have students acquire theories and ideas for systematizing and synthesizing the three systematic categories in elective lectures to be taken.

Seminars on Global Architecture I and II are also prerequisite, in which students are supposed to be directed by their supervisors to understand and perform high-level professional research. Also, to develop and extend your academic knowledge and skills in real world, Internship in Global Architecture is also compulsory.

As shown in an image of possible courses, students may combine the above-mentioned subjects specially prepared for the new program with pre-existing subjects (lectures) offered in English at basic three Departments. The students in the special program must take a total of no less than 30 units of credit for successful completion of the first stage of the program (2-year Master's program), where the student must take at least 20 credits from the lectures newly offered for the international program of Maritime and Urban Engineering.

By combining subjects in a flexible way, the students can design themselves to be professional, for example, in the following academic fields:

(A) Marine Interdisciplinary Engineering
(B) Comprehensive Spatial Design
(C) Urban Synthetic System Design

Requirements for Completion of the Program with Degrees

(1) Master's program

- Successful completion of lectures and seminars for a total of no less than 30 units of credit, among them at least 20 credits from the lectures offered for the international program of Maritime and Urban Engineering.
- Completion of the special research
- Submission and successful defense of the Master's thesis
- Successful passing of the final evaluation of academic achievement

Image of how to take lectures at the International Program of Maritime & Urban Engineering

Symbols（◆: Compulsory Subjects ◇: Elective Subjects／Credit in parentheses）

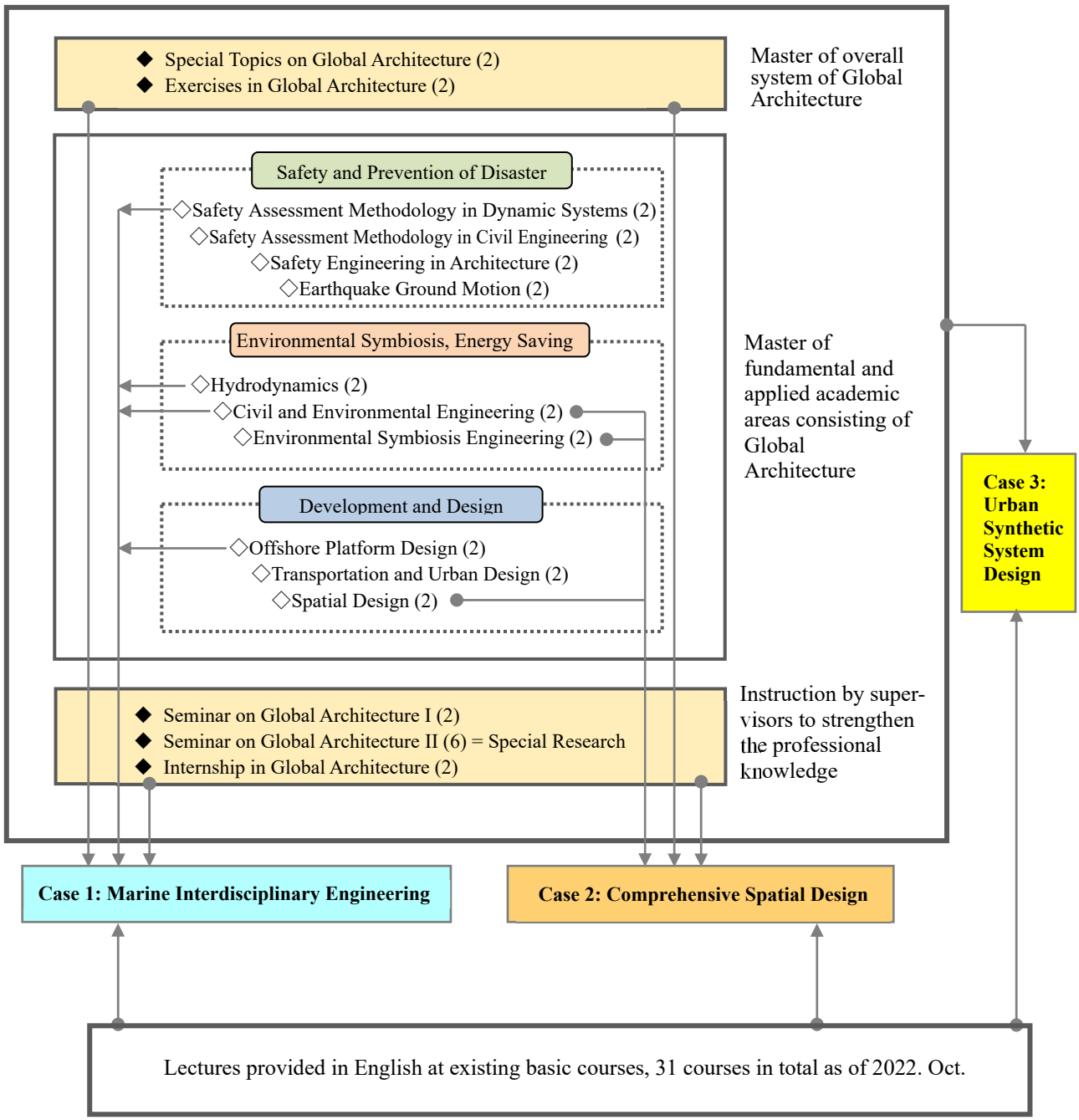

Table of Lectures for the 1st and 2nd years (Master's Course)
to be provided at International Program of Maritime and Urban Engineering

Name of Lectures	Staff in charge	Credit		Classes per week				Remarks (Category of System)
		Com-pulsory	Elective	First Year		Second Year		
				Autumn	Spring	Autumn	Spring	
地球総合工学特論 Special Topics on Global Architecture	All professors	2			2			
力学系の安全性評価手法論 Safety Assessment Methodology of Dynamic Systems	Umeda N.		2		2			Prevention of disaster and Safety
社会基盤安全工学 Safety Assessment Methodology in Civil Engineering	Kamada T. Inui T. Tsutsumi S. Hirohata M.		2	2				Prevention of disaster and Safety
建築安全工学 Safety Engineering of Architecture	Tada M. Sanada Y. Kawabe H. Kuwahara S. Kashiwa S.		2	2				Prevention of disaster and Safety
流体力学 Hydrodynamics	Suzuki H.		2		2			Environmental symbiosis and Energy saving
社会基盤環境工学 Civil and Environmental Engineering*	Aoki S. Irie M. Araki S.		2		2			Environmental symbiosis and Energy saving
環境共生工学 Environmental Symbiosis Engineering	Yamanaka T. Kobayashi T.		2	2				Environmental symbiosis and Energy saving
洋上プラットフォームデザイン論 Offshore Platform Design*	Iijima K.		2		2			Development and Design
交通・地域デザイン学 Transportation and Urban Design**	Doi K.		2		2			Development and Design
空間デザイン学 Spatial Design*	Professors of architectural planning area		2		2			Development and Design
地盤震動論 Earthquake Ground Motion	Kawabe H.		2	2				Prevention of disaster and Safety
地球規模課題解決のためのデザイン演習 Exercise in Global Architecture	All professors	2			2			
地球総合工学インターンシップ Internship in Global Architecture	All professors	2			←――――→			
地球総合工学ゼミナールⅠ Seminar on Global Architecture Ⅰ	All professors	2			2			
地球総合工学ゼミナールⅡ Seminar on Global Architecture Ⅱ	All professors	6					6	

Unmarked Major subjects
* Categorized as both Major subject and Advanced Global Literacy Education
** Advanced Liberal Arts Education

[Course Requirement]
Successful defense of a Master's thesis and a minimum of 30 credits in total; the credits obtained must include at least 20 credits (including 14 compulsory credits) from the above list, and the remaining credits may include the ones from the subjects offered by the other courses in the Division of Global Architecture besides International Program of Maritime and Urban Engineering.

Furthermore, the 30 credits must include at least 20 credits from Major subjects, at least 1 credit from the subjects of Advanced Liberal Arts Education and at least 1 credit from the subjects of Advanced Global Literacy Education.

The credits from a subject which is categorized as both Major Subjects and Advanced Global Literacy Education will be counted as credits for either category, with Advanced Global Literacy Education taking priority over Major Subjects.

[Important Notice]
Master course students must register for Research Training (Code: 285505) in Autumn Semester when he/she is in the second grade.

Course name	Research Training for Master's Thesis
Code number	285505
	Master course students must register "Research Training for Master's Thesis" at KOAN at the beginning of the second year. https://koan.osaka u.ac.jp/koan/

Reference:

Table of Lectures at International Course of Naval Architecture and Ocean Engineering

Name of Lectures	Staff in charge	Credit		Classes per week				Remarks
		Com-pulsory	Elective	First Year		Second Year		
				Autumn	Spring	Autumn	Spring	
弾塑性学 Elastic-Plastic Analysis of Structures	Serizawa H.		2	2				Development and design
数値構造解析 Computational Structural Analysis	Ma N.		2	2				Prevention of disaster and safety
構造力学 I Strength of Ships I	Hayashi S.		2		2			Prevention of disaster and safety
構造力学 II Strength of Ships II			2		2			Prevention of disaster and safety
構造体強度論 Design Philosophy of Ship Structures	Sawamura J.		2	2				Development and design
船舶推進エネルギー論 Theory of Ship Propulsion Energy			2	2				Environmental symbiosis and energy saving
造波理論 Theory of Ship Waves	Iida T.		2		2			Environmental symbiosis and energy saving
船舶耐航性 Sea-keeping of Ships	Minoura M.		2	2				Development and design
運動制御学 Theory of Dynamics and Control	Maki A.		2	2				Environmental symbiosis and energy saving
連続体力学 Continuum Mechanics	Osawa N.		2		2			Prevention of disaster and safety

Table of Lectures for Master's Course of Civil Engineering to be offered in English

Name of Lectures	Staff in charge	Credit		Classes per week				Remarks
		Com-pulsory	Elective	First Year		Second Year		
				Autumn	Spring	Autumn	Spring	
応用鋼構造学 Applied Steel Structures	Hirohata M.		2	2				Prevention of disaster and safety
波変形論 Waves and Nearshore Currents	Aoki S. Araki S. Kawasaki K.		2		2			Prevention of disaster and safety
水工計画論 Planning for Hydraulic and Coastal Engineering	Irie M. Araki S. Nakatani Y. Sasaki Y.		2		2			Development and design
地盤環境工学 Geoenvironmental Engineering	Inui T.		2	2				Environmental symbiosis and energy saving
国際プロジェクトマネージメント論 International Project Management*	Doi K. Kamada T. Kaito K.		2	2				Development and design
応用システム分析 Applied Systems Analysis, Adv.	Doi K. Iida K.		2		2			Development and design

*Some lectures are delivered in Japanese, although the handout is written in English

Table of Lectures for Master's Course of Architectural Engineering to be offered in English

Name of Lectures	Staff in charge	Credit		Classes per week				Remarks
		Com-pulsory	Elective	First Year		Second Year		
				Autumn	Spring	Autumn	Spring	
建築構造設計特論 Structural Design for Buildings	Sanada Y.		2		2			Prevention of disaster and safety
鉄筋コンクリート構造設計演習 Structural Design Practice for Reinforced Concrete	Sanada Y.		1		2			Prevention of disaster and safety
鉄筋コンクリート構造学特論 Reinforced Concrete Structure, Adv.	Sanada Y.		2	2				Prevention of disaster and safety
鉄筋コンクリート構造学特論演習 Seminar in Advanced Reinforced Concrete Structures	Sanada Y.		1	2				Prevention of disaster and safety
鋼構造性能評価工学 Performance Based Design of Steel Structures	Kuwahara S.		2		2			Prevention of disaster and safety
鋼構造性能評価工学演習 Exercises in Performance Based Design of Steel Structures	Kuwahara S.		1		2			Prevention of disaster and safety
建築・都市デザインA Architectural and Urban Design A	Kita M. Yokota T. Abe H. Matsubara S. Yasufuku K. Itami E.		3		6			Development and design
建築・都市デザインB Architectural and Urban Design B	Kita M. Yokota T. Abe H. Matsubara S. Yasufuku K. Itami E.		3	6				Development and design

Advanced Studies for Architectural and Urban Design	Kita M.		2	2				Development and design
Redesign of Housing and Suburb	Itami E.		2	2				Development and design
建築設備設計論 Design Theory of Building Equipment	Kobayashi T.		2	2				Environmental symbiosis and energy saving
建築衛生学 Healthy and Sanitary Environment in Buildings	Yamanaka T.		2		2			Environmental symbiosis and energy saving
建築環境設計論 Design Theory of Building Environment	Yamanaka T.		2	2				Environmental symbiosis and energy saving
建築環境物理学 Physics in Architectural Environmental Engineering	Kobayashi T.		2	2				Environmental symbiosis and energy saving
建築環境デザイン演習 Exercise in Architectural Environment Design	Yamanaka T. Kobayashi T.		2	2	2			Environmental symbiosis and energy saving

[Note]
Refer to the guideline book for the subject category of each lecture.

Requirements for Completion of the Program with Degrees (continued)

(2) Doctor's program
- Successful completion of lectures and seminars for a total of no less than 6 units of credit
- Satisfactory performance in the Qualification Test Part I
- Publication of not less than two peer-reviewed journal papers
- Successful defense of the doctoral dissertation
- Successful passing of the Qualification Test Part II of the course

Table of Lectures from 3rd to 5th years (Doctoral Course)
to be provided at International Program of Maritime and Urban Engineering

Name of Lectures	Staff in charge	Credit		Number of Subjects						Remarks
		Com-pulsory	Elective	Third Year		Fourth Year		Fifth Year		
				Autumn	Spring	Autumn	Spring	Autumn	Spring	
防災・安全工学特論 Disaster Prevention and Safety Engineering	All professors		2	2						
環境共生・省エネルギー特論 Environmental Symbiosis and Energy Saving	All professors		2	2						
開発・デザイン特論 Development and Design of Space, Land and Ocean	All professors		2	2						
海洋・都市基盤工学総合ゼミナール Cross-Boundary Seminar on Maritime and Urban Engineering	All professors	2			2					
地球総合工学超域インターンシップ Cross-Boundary Internship in Global Architecture	All professors	2		←———		———	——→			

[Course requirement]
Successful defense of a doctoral dissertation and a minimum of 6 credits from Major Subjects in the above list.

[Important Notice]
Doctor course students must register "Research Training (Code: 287524) at the beginning of each school year (when starting the Autumn Semester).

Course name	Research Training for Doctoral Thesis
Code number	287524
	Doctor course students must register "Research Training for Doctor's Thesis" at KOAN at the beginning of each school year. https://koan.osaka-u.ac.jp/koan/

Refer to the syllabus for the Abstracts of all the Lectures, offered by International Program of Maritime and Urban Engineering and three Departments.

https://koan.osaka-u.ac.jp/

Important Features in the Special Program

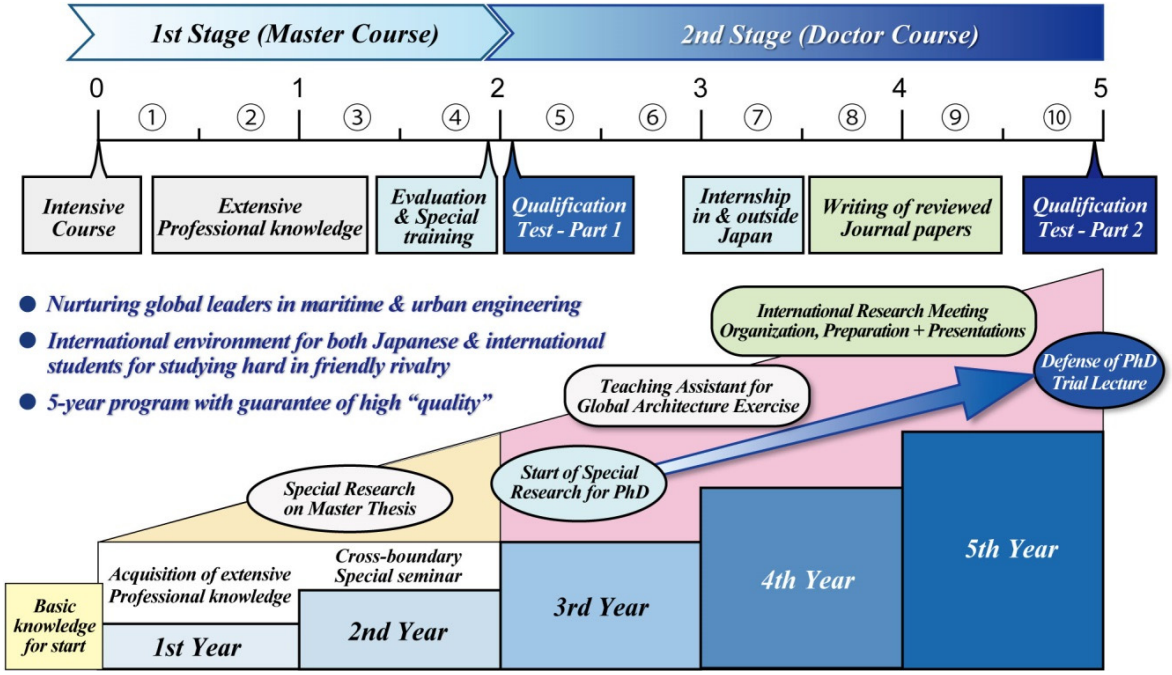

Fig. 2 Illustrative explanation of 5-year course of Maritime & Urban Engineering

1) An intensive short-term course may be organized to guarantee the fundamental knowledge for starting the course with Japanese students, if necessary.
2) Special interdisciplinary (cross-boundary) seminars will be arranged, in which all students will be required to give presentation on the progress of the special research, to learn how to make good presentation, and to widen the spectrum of professional knowledge.
3) Rigorous evaluation will be conducted on the achievement and academic level at the end of the 1st stage (Master's course). If the result is below the requirement, a short-term special training program must be taken.
4) In the Qualification Test Part I, the students will be required to write a proposal of research plan for the doctoral course, review the state-of-the-art in desired research theme, and give a presentation on the plan and review which will be followed by discussions with professors.
5) During the doctoral course, the students should be involved in the International Research Meeting through organization, preparation, and presentation on the progress of the doctoral special research.
6) Qualification Test Part II consists of the defense of dissertation and a trial lecture by the students on a research topic assigned in advance by their supervisors.

Areas for the Special Research

Students will conduct their Special Research from the third semester (the second year) of Master's course under the supervision and instruction of his/her professor or associate professor. In this scheme, each student will choose one research theme from the following categories:

- Naval Architecture
- Ocean Systems Engineering
- Structural and Geotechnical Engineering
- Civil and Social Systems Engineering
- Architectural Structures and Strength
- Environmental and Human Engineering in Architecture