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**Undergraduate International Course Program of Civil Engineering**

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### - Graduate School of Engineering, Kyoto University -

**International Course in Management of Civil Infrastructure in the Department of Civil and Earth Resources Engineering**

<http://www.ce.t.kyoto-u.ac.jp/mci/en>

**International Course in Urban and Regional Development in the Department of Urban Management**

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# KYOTO UNIVERSITY

## International Courses in Civil Engineering

Undergraduate International Course Program of Civil Engineering

International Course in Management of Civil Infrastructure in the Department of Civil and Earth Resources Engineering

International Course in Urban and Regional Development in the Department of Urban Management



## Past and Present

Kyoto University was founded in 1897, the second of seven imperial universities established in Japan. The first faculty to be established was the College of Science and Engineering, followed by the Colleges of Law, Medicine and Letters, as the university developed into an increasingly comprehensive institution emphasizing on fundamental and applied research. Since its foundation, Kyoto University's academic style has been characterized by academic freedom, self-reliance and dialogue. For over a century, the university has consistently produced world-class researchers in a wide spectrum of fields, including nine Nobel Prize laureates.

At present, Kyoto University has 18 graduate schools, 10 faculties, 14 research institutes and 32 education and research centers and facilities. As of May of 2017, we have approximately 9,300 graduate and 13,400 undergraduate students, 2,700 faculty members and 2,800 administrative staff members. Our student-teacher ratio is one of the best in Japan.

Yoshida Campus, the main campus of Kyoto University, is located near the center of Kyoto city. Its facilities are housed in century-old red brick buildings which stand side-by-side with state-of-the-art laboratories. The other campuses are the Uji campus and the Katsura campus. Uji campus houses the university's natural science and energy research facilities whereas Katsura campus forms a Techno-science Hill with four clusters of buildings.

The Main Library of Kyoto University has continuously expanded its collection since its establishment in 1899. The total collection of all Kyoto University libraries including faculty and departmental libraries, amounts to 7,000,000 books and 124,000 periodicals – one of the largest collections in Asia. The Main Library's most recent addition is Learning Room 24, a study room open 24 hours on weekdays.

## Nobel Prize Laureates



Hideki Yukawa  
1949 Physics



Shinichiro Tomonaga  
1965 Physics



Kenichi Fukui  
1981 Chemistry



Susumu Tonegawa  
1987 Physiology or Medicine



Ryoji Noyori  
2001 Chemistry



Makoto Kobayashi  
2008 Physics



Toshihide Masukawa  
2008 Physics



Shinya Yamanaka  
2012 Physiology or Medicine



Isamu Akasaki  
2014 Physics

## Fields Medal Winners

Heisuke Hironaka  
1970

Shigefumi Mori  
1990

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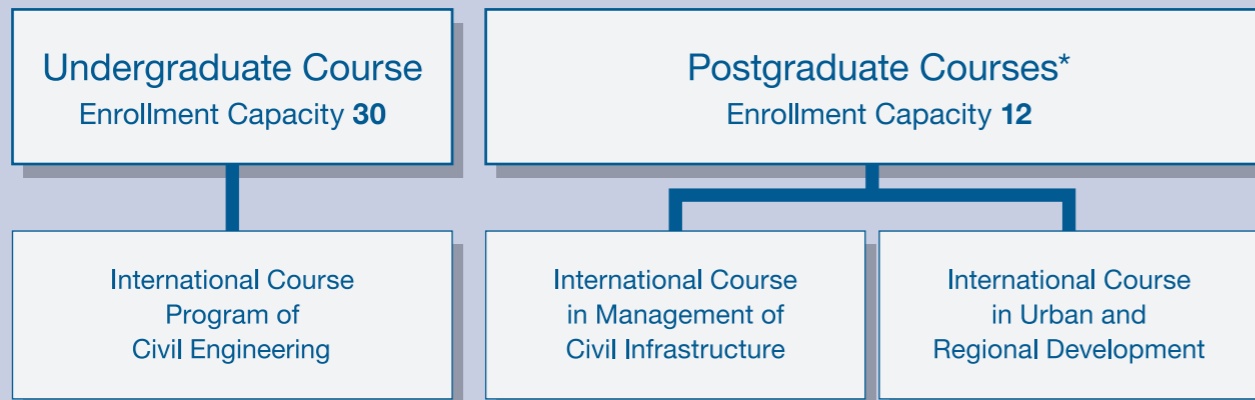
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# International Courses

## International Courses for Under-/Postgraduate Students in Civil Engineering

The School of Global Engineering at the Faculty of Engineering provides the international courses which aim to cultivate human resources capable of designing and managing civil infrastructures while considering global environmental issues in urban and regional areas. All classes are provided in English.

### International Courses in Civil Engineering



\*Graduate School of Engineering



### Life in Kyoto



Kyoto flourished as the capital city of Japan from 794 to 1868 A.D., from the beginning of the Heian aristocracy to the end of the Tokugawa Shogunate or Edo period. To this day, it remains a vibrant artistic capital - a treasure trove of cultural assets and traditions kept alive through its people. Built upon its foundation of skilled artisans and craftsmen - learned in the aesthetics developed over a millennium - modern day Kyoto has also witnessed the birth of frontier technologies and subsequent global-scale successes of such names as Shimadzu, Kyocera and Nintendo. This is a city where the best of both the old and new can be found. Individuals studying and working in Kyoto enjoy the opportunity to discover this city just steps away from their academic interests.



### Students' Voices – Undergraduate Program

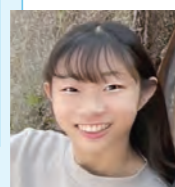
Kyoto University is known for its liberal academic style. I can gain more knowledge about my field of interest. In addition, it helps me to broaden my horizons by interacting with classmates from all over the world with different cultural background while enthusiastic



Jingyu Wang

professors lead students to learn about the specialized courses.

ICP provides me with incredibly good chances in my university life. We can access high levels of civil engineering education through active lectures. I always enjoy academic discussions with my classmates. In addition to that, we enjoy daily communications in diverse communities. Thanks to the



Aoi Sawada

ICP, my perspectives broadened a lot in several aspects.

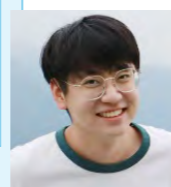
The most fascinating point of ICP for me is the size of the class. Due to relatively small class size, professors can give more attention to each of us. I could immediately ask professors what I didn't understand after class. Furthermore, the English-based learning



Xingjian An

environment ensures that we face no obstacles.

ICP provided me with excellent experiences in coursework, research, and internship. The academic freedom at Kyoto University allowed me to enrol in AI classes and apply to structural analysis. My favourite part is the opportunity to learn, grow, and merge in the international and



Chawit Kaewnuratchadasorn

Japanese academic and social communities.

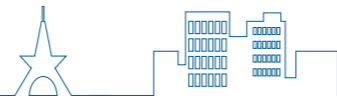
### Practical Training for Global Issue Solving

Students can participate in "International Internship" to learn connection between basic academic knowledge and its application in practices of civil engineering in the real world through practical experience in different organizations such as international organizations, government institutions, and private companies.



# Civil Engineering

## Overview



### What's Civil Engineering?

Civil engineers play important roles in improving the quality of life in human society. The technology and knowledge in civil engineering have contributed to hazard mitigation, improvement of infrastructures and creation of safer and pleasant communal spaces. In general, Civil Engineering consists of four main sub-disciplines;

#### Structural Engineering

Structural engineering shapes the basic structures of the world we live in, such as roadway and railway bridges. It contributes to design, construction and maintenance of the structures. The prevention and mitigation of natural disasters are also important missions for structural engineers. Developing sustainable infrastructures combined with environmental aspects is our next challenge.

#### Hydraulics

Hydraulics deals with the study of fluid motion, and the interaction of fluid with the

surrounding environment. In a larger scale, hydraulics is vital in understanding the flow of rivers, lakes and oceans. The knowledge of hydraulics is indispensable in water-system management, flood hazard mitigation, as well as the maintenance of rivers, lakes and oceans eco-system in local and global environmental scales.

#### Geomechanics

Geomechanics involves the study of the engineering behavior of earth materials such as soils and rocks, playing a crucial role in all civil engineering projects since most constructions take place on or in the ground. The principles of soil and rock

mechanics are used to investigate the physical-chemical conditions of the subsurface, the dynamic behavior of soils as well as the stability of slopes and soil deposits, to design, construct and maintain earthworks and structure foundations.

#### Urban planning

Urban Planning and Management aims to promote knowledge to create safe, comfortable and sustainable cities. Therefore common research themes of urban planning laboratories are to develop comprehensive and practical methodologies for infrastructure design and management. Such methodologies should consider a

potential broad range of impacts, such as economic, societal as well as environmental ones. These methodologies are then used to assess potential future scenarios and to develop policy suggestions. Given the complexity of our societies and wide ranging impacts of urban planning policies, students in urban planning are encouraged to develop a broad range of skills and knowledge, including subjects such as operations research and economy as well as sociology, psychology and philosophy.

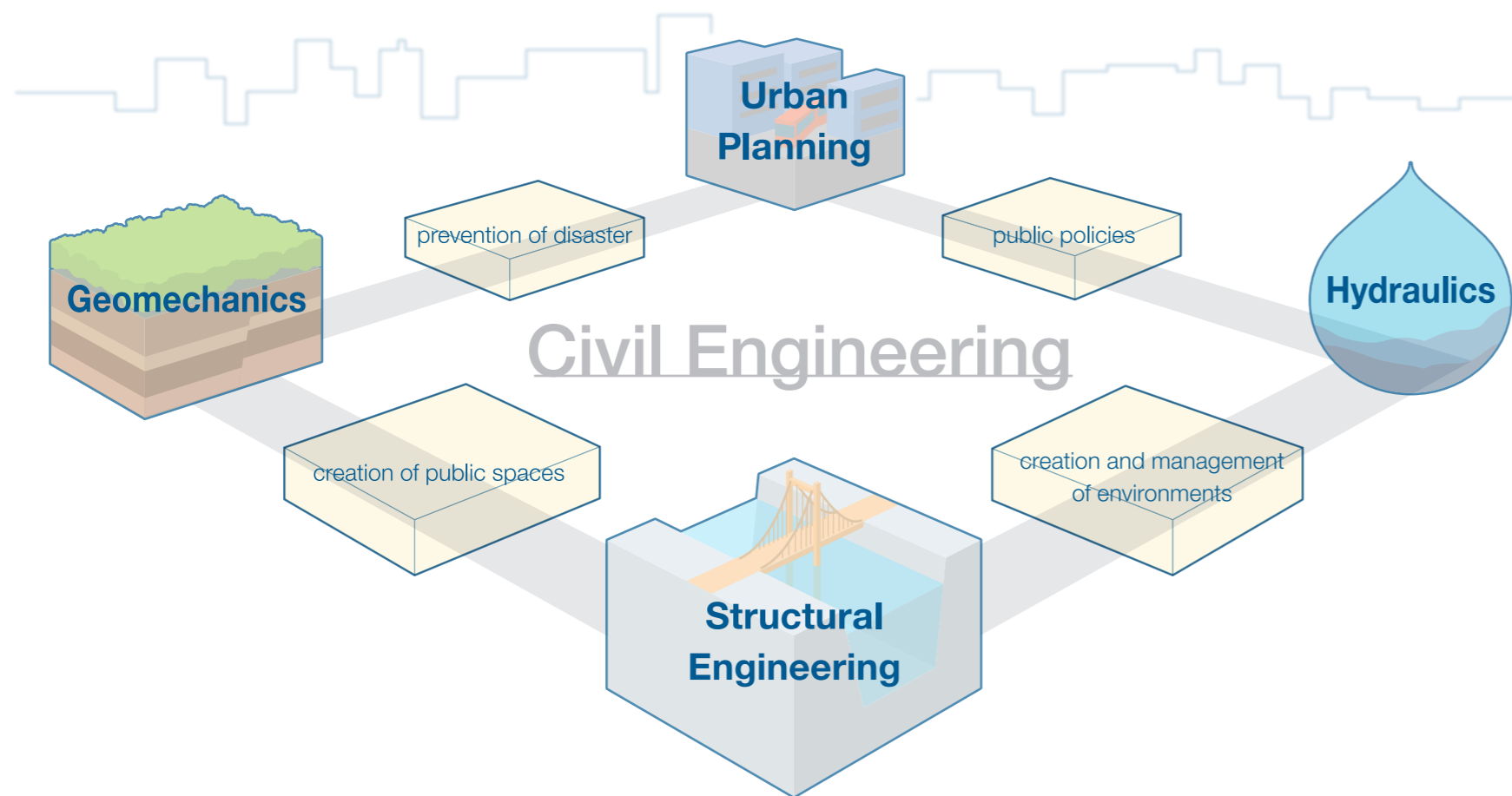
## Undergraduate International Course Program of Civil Engineering

The undergraduate international course program is a 4-year program leading to a Bachelor of Engineering degree. In the first two years, students are required to take classes in fundamental mathematics, physics, as well as liberal arts subjects. Japanese language and scientific English classes are also available. Specialized civil engineering classes begin from the second year, comprising classes in environmental, earth resources and energy science engineering. Final year students will undertake research for their bachelor thesis at their designated laboratory. The thesis must be presented and examined in February of the final year, in order to graduate in March.

<http://www.s-ge.t.kyoto-u.ac.jp/int/en>

VR Intro for Kyoto University Undergraduate International Course Program of Civil Engineering:

<https://www.youtube.com/watch?v=Z836iG1iDNA>



#### Japan's civil engineering milestones

Clockwise from top left; Kurobe dam (height 186m), Shinkansen (300km/h), Seikan tunnel (length 53.85km), Akashi bridge (length 391m)

### Job Opportunities after Graduation

Our curriculum allows graduates to obtain technical, advisory or managerial positions. Graduates are expected to pursue their career in

International Institutions

Government Institutions

Multinational Cooperation

Research Institutions

Leading Japanese Companies, e.g. construction companies

# Civil Engineering

## Postgraduate International Course in Management of Civil Infrastructure in the Department of Civil and Earth Resources Engineering

This Master's program aims to cultivate human resources capable of managing civil infrastructures and addressing environmental issues in various countries, particularly in the developing countries of Asia and Africa. Several issues are in focus, such as; achieving a stable supply of natural resources and harmonize human activities with the global environment; the development of fundamental key technologies that support public infrastructure and energy development; the creation and development of new versatile technologies and design methods concerning the construction, improvement, operation, and maintenance of public infrastructure and disaster mitigation measures, as well as technologies related to the exploration, development, and utilization of the natural environment, natural resources and energy. Such issues are approached by the framework of applied mechanics and computational mechanics with the integration of theoretical and experimental works.

<http://www.ce.t.kyoto-u.ac.jp/mci/en>



## Postgraduate International Course in Urban and Regional Development in the Department of Urban Management

This Master's course aims to make advances in social analysis technology utilizing urban engineering, traffic engineering, and environmental system engineering to analyze human activities in cities. Research is conducted in urban planning and traffic planning to realize safe and sustainable urban systems. Advances in urban infrastructure relating to building foundations and rivers are examined. It also aims to establish methodologies and engineering techniques for the comprehensive management of urban systems, incorporating assessment of the sustainability of cities based on cutting-edge research and an interdisciplinary perspective that embraces the social sciences and humanities. Advanced information communication technology is integrated with social infrastructure technology in order to realize sustainable, safe, and internationally competitive urban systems that can ensure a high quality of life. Lectures and seminar-based subjects are designed for students to independently plan, implement, summarize and present research results from project surveys and company seminars.

<http://www.um.t.kyoto-u.ac.jp/urd/en>



## Student's Voice – Master's Program



**Name:** Ma Xinda  
**Enrolled year:** 2017 April (as a Research Student in Oct, 2016)  
**Hometown:** Fuzhou, China  
**Course name:** International Course in Management of Civil Infrastructure  
**Laboratory:** Infrastructure Innovation Engineering Lab.  
**Title of Thesis:** Uncertainty Quantification in System Identification for Output-only data  
**University of undergraduate study:** Chang' an University

### What did you study or major in at undergrad level?

Before receiving BEng in Civil Engineering, I covered a wide range of subjects in structural engineering, geotechnical engineering as well as engineering management, and found wherever mechanical analysis applies excited me the most. I can still remember the thrill when I saw the continuous-rigid-frame with high piers spanning over 100 meters across the valley during an internship, of which the beauty of mechanical rationality and simplicity, along with the concrete



texture, was deeply engraved in my mind.

### Why Kyoto University?

Besides the high reputation and its spirit of academic freedom, in the beginning, the main reason that I applied to Kyoto University was that there is a team concentrating on the research topic I was interested in. Having been part of the campus for a year, I believe I made the right choice and I really enjoy the academic life in Kyoto University: I have met some real competitors who maxed out their potential in the free academic culture here, and I have got the chance to cultivate my ability in interdisciplinary research, participate in the cutting-edge project that I have longed for and discuss the topic of my concern with prominent researchers for hours – life here is even better than what I dreamt of.

### What is a typical day at Kyoto University like?

On the path to the campus, I can always meet students coming from different backgrounds talking about issues they are interested in, which is always a delightful experience for me. In terms of the curriculum, Kyoto University provides a fairly comfortable environment of interdisciplinary study for international students. I may very well be taking a course in Informatics School, from which I can learn the state-of-art knowledge in machine learning and afterwards, visit the departments of Materials Science and Engineering and listen to the research progress of a Nobel Prize candidate.



As a postgraduate student, I spend considerable amount of time on research. Although my advisor has a very tight schedule, he would always spare time to discuss the problem I am concerned with. Despite all the challenging and hectic works in laboratory, students here are still able to find time to enjoy themselves like hanging out with friends over a game of badminton and basketball in the gym. As the Katsura Campus located on the hill west of Kyoto City, those who leave the campus late might have the chance to view the lovely night of the whole city.

### What is your favorite class?

Structural stability is the one I enjoyed the most. The course is more than the fundamental concepts of static and dynamic stability of large-scale structures. When it came to the second part of the course, the Professor presented the theory of the stability around the equilibrium points based on the state equation of motion, in which the nonlinearity of external, damping and restrung forces were taken into account. With his expertise in wind engineering, wind-induced galloping of a square prism and one-degree-of-freedom system with nonlinear spring were introduced in detail. Moreover, as a practical example of chaos theory,

chaotic motion of a pendulum subjected to periodic external force was also well explained. I will never forget the excitement I had in the course, which taught me to perceive the dynamic system in a nonlinear perspective and broke many of the stereotypes I had on the motion of structural system.

### What is life in Kyoto like?

Living in Kyoto is fabulous. One can always see the beauty of it being a lovely city with its long history as the heart of Japan and meanwhile, enjoy the convenience brought by modern technology. I have been here for more than a year, but the city never ceases to amaze me with its unparalleled beauty. As the Cherry blossom blooming along the streets, among the temples and shrines, the whole city becomes a land of dreams, a scene from a tale. Thanks to the humanized facilities, being a meniscus injury sufferer, I can spend a day hanging out in the city without stepping a single stair and that certainly helps my knee to heal. Moreover, one can find distinct varieties of food here, no matter which country you are from, Europe, Central or Southeast Asia



etc., it would always be easy to find the food that matches your taste and whet your appetite.

### Where do you live?

My apartment is near Kita-Shirakawa, northeast of the Yoshida Campus, which is the main campus of Kyoto University and located in the north part of Kyoto city, where I can easily find the interdisciplinary resources and that certainly helps the research.

### What do you want/plan to do after you graduate?

Currently, I am going to further my academic career as a PhD candidate in my area.

### Any message for prospective applicants for last?

When I came to Japan, there was a Japanese student tutor who was assigned for me in order to assist me to complete certain initial formalities, filling in application forms and help me to adapt to life in Japan, which means it would be perfectly fine if you come here without Japanese language ability. However, being able to use Japanese language in daily life can be an added advantage as you communicate with lab mates, travel and make friends with Japanese students.



# Maps



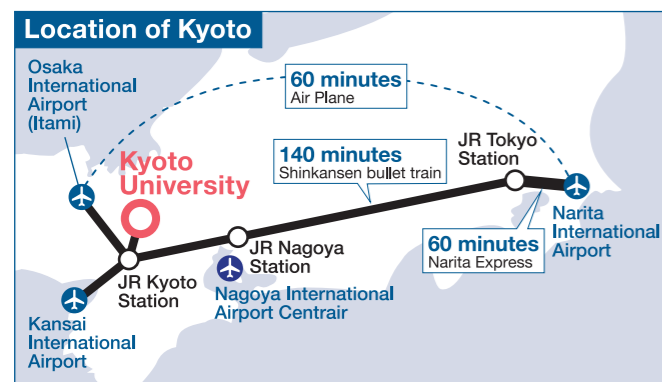
Yoshida Campus



Katsura Campus



Uji Campus



## Mission Statement

Kyoto University states its mission to sustain and develop its historical commitment to academic freedom and to pursue harmonious coexistence within human and ecological community on this planet.

### Research

Kyoto University will generate world-class knowledge through freedom and autonomy in research that conforms with high ethical standards.

As a university that comprehends many graduate schools, faculties, research institutes and centres, Kyoto University will strive for diverse development in pure and applied research in the humanities, sciences and technology, while seeking to integrate these various perspectives.

### Education

Within its broad and varied educational structure, Kyoto University will transmit high-quality knowledge and promote independent and interactive learning.

Kyoto University will educate outstanding and humane researchers and specialists, who will contribute responsibly to the world's human and ecological community.

### Relationship with society

As a university committed to a broad social engagement, Kyoto University will encourage cooperation with local and national society, and will disseminate knowledge informed by the ideals of freedom and peaceful coexistence.

As an international institution, Kyoto University will promote foreign academic exchange and thereby strive to contribute to the well-being of the world.

### Administration

In order to enhance the free development of learning, Kyoto University will pay due respect to the administrative independence of each of its component institutions, while promoting cooperation among them.

Kyoto University will conduct its administration with regard for the environment and respect for human rights and will be accountable to society at large.

