



Saitama University

# PROSPECTUS

## International Graduate Program on Civil and Environmental Engineering



Department of Civil and Environmental Engineering

## Contents

<b>Message from the Head of Foreign Student Office (FSO)</b>	<b>2</b>
<b>Saitama University and Its Graduate Program</b>	<b>3</b>
Saitama University and Its Vicinity	3
Overview of the Graduate Program	3
Requirement for Admission to the Program	4
Study Programs	5
I ) Master of Engineering	5
II) Doctor of Engineering/Doctor of Philosophy	6
Qualifications and Financial Assistance	6
Lecture Courses	7
I ) Master's Course	8
II) Doctoral Course	8
Research Groups	8
Geotechnical and Geosphere Research Group	9
Earthquake Disaster Prevention & Mitigation Group	11
Structural Engineering, Mechanics and Materials Group	12
Hydraulic and Environmental Engineering Group	14
Transportation & Planning Group	16

# International Graduate Program on Civil and Environmental Engineering

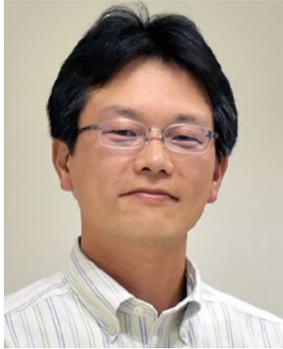


## PROSPECTUS



**Graduate School of Science and Engineering  
Department of Civil and Environmental Engineering**

## Message from the Head of Foreign Student Office (FSO)



I am pleased to introduce you our International Graduate Program on Civil and Environmental Engineering at Saitama University, Japan. This English medium graduate program started in 1992 and runs master's and doctoral courses for international students. Since its establishment, the program has produced more than 550 graduates from over 30 countries. In this prospectus, you will find all relevant information about our program.

The graduate program offers unique opportunities to highly qualified international students pursuing graduate level study in Japan seeking the most-advanced academic and practical expertise, skills and experiences in various fields of civil and environmental engineering. The fields of study that we cover include geotechnical and geological engineering, earthquake engineering, structural engineering, concrete and material engineering, infrastructure maintenance and management, hydraulics and water resources engineering, coastal and ocean engineering, environmental engineering, ecological engineering, transportation engineering, and land and regional planning.

Our two-year master's program consists of both the course works and research. Our program puts importance on students' research activities, through which they can learn how to tackle and solve a problem with unknown answer. We believe that such experiences should be very useful for students in their future career where they will face various unsolved problems. The main content of our doctoral program is, of course, research. As in doctoral programs around the globe, students are expected to make new contributions to knowledge in relevant field of study through their research. They will take on such challenges in furthering the advancement of their relevant field of study with the assistance from our faculty members who are experts in their respective field of study.

The program starts either in April or October and requires a standard full time attendance of two years for a Master's degree and three years for a Doctoral degree. Various full and partial scholarships, designated to our graduate program, are available for international students. Admission to the program, however, is highly competitive and only about 20-25 students are admitted every year. Full scholarships provided by the Ministry of Education, Culture, Sports, Science and Technology of the Government of Japan (MEXT), Asian Development Bank-Japan Scholarship Program (ADB-JSP), and Joint Japan World Bank Graduate Scholarship Program (JJWBGSP) are available for international students. Additionally, partial scholarships provided by several public and private organizations are also available for international students. Moreover, we also accept few qualified self-financed students each year.

Application forms and detailed information on the selection procedure are available at our web site: <http://intl.civil.saitama-u.ac.jp/admissions>

We look forward to welcoming you to our graduate program.

**Yasunao Matsumoto**

Professor and Head of the Foreign Student Office

# Saitama University and Its Graduate Program

## ■ Saitama University and Its Vicinity

Saitama University is located in a quiet suburban area of Saitama city, the capital of Saitama prefecture. Saitama city is located about 30 kilometers north of metropolitan Tokyo. Access to central Tokyo by East Japan Railway is very convenient, which is about an hour's journey from the university. This enables residents of the university to access all bookstores, libraries, and research facilities around Tokyo area.

The main library of the university has a large collection of books and academic journals. The inter-library loan service offered by the main library enables faculty, staff and students to borrow materials from all libraries in Japan and many libraries abroad. Additionally, each department has its own library to facilitate research and teaching for faculty, staff and students in the department. The University has many sports facilities including an athletic field of 30,937 m<sup>2</sup>; two gymnasiums of 2,112 m<sup>2</sup>; Judo, Karate, Kendo and Aikido halls totaling 863 m<sup>2</sup>; and a swimming pool of 2,406 m<sup>2</sup>.



The Saitama University International House was established for the purpose of providing accommodation and other facilities for international researchers and students in order to contribute to international exchange in many fields of research and education promoted by the university. The House consists of three buildings with a total of 172 single, couple and family rooms. In principle, the period of residence for researchers and students in the International House is one month minimum and one year maximum.



## ■ Overview of the Graduate Program

Saitama University is a reputed national university for higher education and research in Japan. The university consists of five faculties : Faculty of Liberal Arts, Faculty of Education, Faculty of Economics, Faculty of Science, and Faculty of Engineering. There are three graduate schools in the university : the Graduate School of Humanities and Social Science, Graduate School of Education, and Graduate School of Science and Engineering. Total number of full time students as of May 2021 was 8,311 students, among which the number of undergraduate students was 6,827 and the number of graduate students (master's and doctoral courses) was 1,484.

The International Graduate Program on Civil and Environmental Engineering of the Graduate School of Science and Engineering of Saitama University offers highly qualified students from overseas opportunities to pursue graduate studies and do research in the field of environmental and civil engineering. The fields of study include Infrastructure Management, Transportation Planning, Environmental Engineering, Ecological Engineering, Coastal and Ocean Engineering, Hydraulics and Water Resources Engineering, Geotechnical and Geological Engineering, Concrete and Material Engineering, Structural and Wind Engineering, Earthquake Engineering, etc.

The graduate program includes courses specially designed for international students, in which class

instruction and research supervision are all conducted in English. Master thesis and doctoral dissertation are accepted in English. Japanese language courses are also offered for foreign students and their spouses. Currently, the number of foreign students registered in this program is 75 students, comparable to that of Japanese graduate students in the Department.



The program starts in April or October, when the spring and fall semesters begin and students are required to stay a minimum of two years for a Master of Engineering and three years for a Doctor of Engineering/Doctor of Philosophy degree. Scholarships for master's degree course are available from the Asian Development Bank-Japan Scholarship Program (ADB-JSP), World Bank (Joint Japan/World Bank Graduate Scholarship Program, JJ/WB GSP). For doctoral degree course, the Ministry of Education, Culture, Sports, Science and Technology of the Government of Japan (MEXT) provides scholarships for talented doctoral applicants. Some private and public agencies also offer scholarships for graduate studies in our program.

So far, 599 students from different countries have graduated from our program and they are engaged in academic and professional activities in different parts of the world. We take pride that many of our graduates have established themselves very well in their respective careers.

## ■ Requirement for Admission to the Program

The students are admitted to the Graduate School of Science and Engineering of Saitama University on the recommendations of the Department of Civil and Environmental Engineering. The Department selects students on the basis of the applicant's academic qualifications shown on the documents submitted by the applicants. However, the applicants who have already been studying in Japan must take written examinations and interview held at the university. Such applicants should consult the Graduate School of Science and Engineering well in advance for the timetable and other information related to the examination and interview.

Since the program is highly selective and the number of foreign students that can be accommodated is limited, only the most qualified applicants are admitted. After the Department have thoroughly reviewed and evaluated the application materials of each applicant, specified recommendation of the Department for admission is granted.

To be eligible for admission to the master's degree course, an applicant should hold a degree from an accredited institution comparable to the bachelor's degree offered by Saitama University and have sufficient undergraduate training to undertake graduate study in civil and environmental engineering. For admission to the doctoral course, an applicant should hold a Master's degree comparable to that offered by Saitama University or its equivalent. However, an applicant with equivalent professional experience may be admitted to the program in lieu of the university credentials.

Application forms are available to download from the Foreign Student Office's website (<http://intl.civil.saitama-u.ac.jp/application-forms>). Moreover, one can also request the application forms by writing to the Foreign Student Office, if required. The following documents must be submitted when applying to the program:

- Completed application form (Form A)
- Certified copies of previous academic records
- Certificate of graduation
- Two letters of recommendation (Form B)
- Essays on selected topics (Form C)
- A concise resume (Form D)
- Certificate of English proficiency (an official score of TOEFL, IELTS or equivalent)

The schedule for the application and admission processes is shown below :

#### (A-1) Doctoral applicants who are seeking admission with Japanese Government (MEXT) scholarship

- November 20, deadline for receiving applications
- December 16-19, notification of results to the short-listed candidates
- December 19-27, internet-based interviews for the short-listed candidates
- January 5-12, of the following year, notification of results to successful candidates
- September 28, of the following year, Graduate program begins

#### (A-2) Master's applicants who are seeking admission with ADB-JSP scholarship

- September 20, deadline for receiving applications
- March 15, of the following year, notification of results to successful candidates
- April 1, of the following year, Graduate program begins

#### (A-3) Master's applicants who are seeking admission with JJ/WB GSP scholarship

- Details are to be announced from our website: [https://intl.civil.saitama-u.ac.jp/important\\_dates](https://intl.civil.saitama-u.ac.jp/important_dates)

#### (B) Applicants who are seeking only admission, and are self-funded or have already obtained other scholarships/financial assistance

- November 1, deadline for receiving applications for the April intake
- December 20, notification of results to applicants for the April intake
- April 1, of the following year, Graduate program begins
- April 15, of the following year, deadline for receiving applications for the October intake
- June 20, of the following year, notification of results for the October intake
- September 28, of the following year, Graduate program begins

An applicant must be in good mental and physical health. If admitted, the applicant must be able to come to Saitama University by April 1-3 (for April intake) or October 1-3 (for October intake) of the following year.

## ■ Study Programs

Currently, the Department of Civil and Environmental Engineering of Saitama University through the Graduate School of Science and Engineering offers Master of Engineering and Doctor of Engineering/Doctor of Philosophy degree programs in broad range of environmental and civil engineering disciplines.

### 1) Master of Engineering

To qualify for the Master of Engineering, the student must comply with the following requirements :

- The period of full time attendance to fulfill the requirements of the degree program is minimum two years.

- A minimum of 30 credits beyond the Bachelor's degree is required, including 10 credits awarded for a thesis.
- A thesis based on the research carried out under the supervision of his/her thesis supervisor must be completed and satisfactorily presented.

## II ) Doctor of Engineering/Doctor of Philosophy

To qualify for the degree of Doctor of Engineering/Doctor of Philosophy, the candidate must have a broad knowledge of his/her field of study and demonstrate distinguished accomplishment and substantial contributions to the advancement of that field through profound knowledge and original ideas. The candidate must comply more specifically with the following regulations :



- The period of full time attendance is minimum three years beyond a Master's degree.
- A minimum of 12 credits from course and laboratory works beyond Master's degree is required.
- The student must satisfactorily present his/her dissertation proposal, approximately one and a half years from his/her enrollment in the program.
- As the most important requirement for the doctoral degree, a dissertation based on original research carried out at Saitama University under the supervision of his/her advisor and with the assistance of the candidate's supervising committee must be completed and presented. The candidate must pass a final examination on the dissertation and a comprehensive examination in his/her specific field of study.
- At least two recognized journal publications (accepted or published) based on the doctoral research with a minimum of one paper as the first author.

## ■ Qualifications and Financial Assistance

The selection process is highly competitive, and the program admits only 15 to 20 students to the master's course and 7 to 10 to the doctoral course. Scholarships offered by Monbukagakusho, ADB-JSP, and JJ/WB GSP are available to students who have demonstrated academic excellence.

All scholarships cover tuition and academic fees, a monthly allowance and a round air ticket to the awardee's home country. The Monbukagakusho Scholarship for doctoral course is granted initially for one and a half years extendable up to three years based on the satisfactory performance of the student. The master's degree scholarships are granted for two years. Both master and doctoral scholarships are not extendable beyond two and three years, respectively. The master's degree scholarships require the awardees to return to their home countries upon completion of study to contribute to their countries' development.

### (A-1) A doctoral degree applicant for the Japanese Government (MEXT) Scholarship must :

- be a national of a country where the Japanese Government (MEXT) Scholarship is offered.
- not be over 35 years of age as of April 1 of the application year.

If admitted, the applicant must be able to come to Saitama University within October 1-3 of the following year. An applicant who was a recipient of the Japanese Government Scholarship for the last three years is not eligible for this scholarship program.

### (A-2) A master's degree applicant for the ADB-JSP Scholarship must :

- be a national of an ADB borrowing member country and Japanese ODA scholarship eligible country which is listed in the ADB-JSP website page: <https://www.adb.org/work-with-us/careers/japan-scholarship-program>

- not hold dual citizenship of any developed country
- have acquired at least two years of full-time professional working experience acquired after a university degree at the time of application.
- not be over 35 years of age at the time of application.
- agree to return and work in his/her home country for at least two (2) years after completion of studies under the program in order to contribute to its development.
- not be an executive director, an alternate director, management, staff and consultants of ADB, or the close relatives of the aforementioned by blood or adoption with the term "close relative" defined as: spouse, mother, stepmother, father, stepfather, sister, stepsister, brother, stepbrother, son, daughter, aunt, uncle, niece, or nephew.
- not be a staff of ADB-JSP designated institutions.
- not be living or working in a country other than his/her home country.
- not be enrolled in graduate degree programs.

**(A-3) A master's degree applicant for the JJ/WB GSP Scholarship must :**

- be a national of a World Bank member developing country listed in the World Bank scholarship website page: <https://www.worldbank.org/en/programs/scholarships#3>.
- not hold dual citizenship of any developed country.
- hold a bachelor's (or equivalent) degree earned at least 3 years prior to the application deadline.
- be employed in development-related employment in a paid full-time position at the time of submitting the scholarship application. Have at least 3 years of paid development-related employment since earning a Bachelor's degree (or equivalent university degree) and acquired within the past 6 years from the date of the Application Deadline.
- not be an executive director, his/her alternate, and/or staff of any type of appointment of the World Bank Group or a close relative of the aforementioned by blood or adoption with the term "close relative" defined as: Mother, Father, Sister, Half-sister, Brother, Half-brother, Son, Daughter, Aunt, Uncle, Niece or Nephew.

The program will, in principle, not support applicants who are pursuing a second master's degree. Applicants living or working in a country other than his/her home country are not eligible for the scholarship. Those admitted must be able to come to Saitama University within April 1-3 or October 1-3 (please refer to "Requirement for Admission to the Program" on page number 4 of this document.).

Applicants are requested not to contact the Asian Development Bank and World Bank regarding the scholarships. All inquiries about the scholarships should be directed to the Department of Civil and Environmental Engineering at Saitama University.

There is no separate application form for all the above scholarships. The same application forms are used for all these scholarship programs. One set of application materials is enough to be considered for all of the scholarships, if eligible.

Applicants who pass the selection without these scholarships must either be self-supported or obtain other scholarships, financial assistance or financial grants from different sources to be admitted to the program.

Indicative figures for academic and living expenses for the next academic year are : tuition fee 535,800 yen per year, admission fee 282,000 yen upon admission, and cost of living about 110,000 to 140,000 yen a month.

## ■ Lecture Courses

The following courses conducted in English are offered by the program. Foreign students with sufficient Japanese capability may also take courses taught in Japanese which are not included in the following list. Most graduate courses are equivalent to two credits, i.e., two lecture hours per week for 15 weeks.

## 1 ) Master's Course

- Advanced Analysis of Vibrations and Waves
- Advanced Course in Biological Environmental Responses
- Advanced Course in Landscape Planning
- Advanced Course in Technical English III
- Advanced Course in Transportation System
- Advanced Course in Water Quality Management
- Advanced Geoenvironmental Engineering
- Advanced Lectures on Strong Motion
- Advanced Mathematics for Planning
- Advanced Theory on Earthquake Engineering
- AI and Data Science for Civil Engineering
- Climate and Society
- Concrete and Advanced Cement Based Materials
- Construction Management
- Environmental Vibration and Noise
- Geosphere System Engineering
- Geotechnical Earthquake Engineering
- Landscape Planning and Design
- Mechanics of Geomaterials
- Mechanics of Geostructures
- Numerical Analysis for Civil Infrastructures
- Numerical Analysis on Hydraulic Environment
- Practical Numerical Simulation on Hydraulic Environment
- Structural Design and Analysis
- Structural Dynamics and Control

## 2 ) Doctoral Course

- Advanced Lecture on Carbon Cycling in Aquatic Ecosystem
- Advanced Lecture on Earthquake Disaster Mitigation
- Advanced Lecture on Geomaterials in Geosphere System
- Advanced Lecture on Microscopic Behavior of Cementitious Materials
- Advanced Lecture on Seismic Resistant Design of Reinforced Concrete Structures
- Advanced Lectures on Reinforced Concrete
- Advanced Theory on Dynamic Design Method
- Advanced Theory on Elastic Waves
- Advanced Topics in Structural Dynamics
- Applied Mechanics of Materials
- Environmental Geotechnical Engineering
- Geotechnical Aspects of Earthquake Engineering
- River Environmental Engineering
- Sensing and Analysis for Geotechnical Engineering
- + Others (Detailed list of course are available on the program's website at: <http://intl.civil.saitama-u.ac.jp/list-of-courses>)



## Research groups

Research themes under the International Graduate Program on Civil and Environmental Engineering are categorized into five academic research groups.

**Geotechnical and Geosphere Research Group**

**Earthquake Disaster Prevention & Mitigation Group**

**Structural Engineering, Mechanics and Materials Group**

**Hydraulic and Environmental Engineering Group**

**Transportation & Planning Group**

## Geotechnical and Geosphere Research Group



Geotechnical and Geosphere Research Group consists of three subgroups, “Geotechnical engineering for disaster mitigation”, “Geoenvironmental engineering”, and “Geosphere system engineering”.

“Geotechnical engineering for disaster mitigation” covers research topics related to soil liquefaction, slope stability, ground reinforcement and improvement techniques. Various kinds of laboratory testing, field-scale investigation and numerical modeling are used to understand soil mechanical properties and behaviors.

“Geoenvironmental engineering” covers research topics related to environmental risk assessment at contaminated ground, development of site-specific appropriate techniques for pollution control, measurements and models for water, gas, solute, heat transport in soil, and characterization of soil structure and pore networking.

“Geosphere system engineering” covers research topics related to geological disposal of radioactive waste and evaluation of the rock properties and their behaviors for construction and maintenance of rock structures. Researches on weathering process and its restoration technique for archeological sites and civil engineering heritages have been also investigated on the basis of the knowledge of geology.



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## Earthquake Disaster Prevention & Mitigation Group



Earthquake Disaster Prevention & Mitigation Group covers studies on earthquake engineering and the engineering applications of earth science. The main research activities are: geomechanics; seismology; seismic wave propagation; site and propagation path effects on strong ground motion; temporal and spatial variations of strong ground motion; dynamic failure of ground; mechanics on granular materials and numerical experiments of them; deformation of surface soil layer due to earthquake faults; seismic excitation and structural response; soil-structure interaction; base isolation systems; lifeline systems; and reliability theory.



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## Structural Engineering, Mechanics and Materials Group



The Structural Engineering, Mechanics and Materials Group conducts research and development on planning, design, performance evaluation, and maintenance of civil engineering structures, such as steel, reinforced concrete, prestressed concrete, and composite structures. Particularly, studies on mechanical and physicochemical behavior of construction materials and development of new structural types, new construction methods, and new materials are being carried out in this group.

The research topics in structural mechanics include understanding the mechanical behavior of new structural system, the relationship of microstructure with mechanical characteristics and fracture phenomena in structural materials.

The research areas in structural dynamics cover understanding and mitigation of dynamic responses of structures to earthquake, wind or traffic, vibration-based structural health monitoring, and additionally human responses to vibration and noise.

The concrete and rubber materials are mainly studied, aiming to quantitatively evaluate the long-term behavior based on chemical reaction, microstructure, and time dependent behavior of material characteristics related with temperature. Furthermore, application of new materials, such as fiber reinforced polymers, in civil engineering structures are investigated.

As described above, the Structural Engineering, Mechanics and Materials Group works on safety and durability of civil engineering structures by conducting comprehensive researches and developments in wide academic field.





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## Hydraulic and Environmental Engineering Group



The Hydraulic and Environmental Engineering group are divided into two groups, Hydraulic and Environmental Engineering (HEE) Lab. and Applied Ecological Engineering (AEE) Lab.

Research areas in HEE are environmental hydraulics, disaster risk reduction, and mitigation methods; understanding natural phenomena in coastal area and river watershed and thereby developing methodologies that minimize damage. Studies in HEE on the coastal region are divided into two topics. They are: 1. proposing an Eco-DRR method using forest and/or lagoon, and optimal hybrid defense systems comprising of sea embankment and coastal forest on tsunami reduction, and 2. clarifying the secondary disaster due to driftwoods and its mitigation method by trapping debris. Similarly, studies on river hydraulics in HEE are divided into four topics. They are: 1. in the middle stream region: management method of river channel and vegetation, growth dynamics of river vegetation under flood disturbances, 2. in upstream region: sediment budget around dams and characteristics of river channels downstream of a dam, 3. on embankment failure due to over-topping flow: experimental and numerical studies on the mechanism and prevention, and 4. on flood inundation: location of potential flood inundation, risk and evacuation timing for different precipitation patterns.

The research areas in Environmental Engineering (AEE Lab.) are development of technology for the natural water quality conservation, wastewater treatment, and environmental response and control of the living organisms in freshwater ecosystem, etc. Staffs are the main members of Interdisciplinary education program for applied science and technology in global environment for Master study.





## Norio Tanaka

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# Transportation & Planning Group



Transportation & planning group conducts research on urban and traffic planning to achieve better life in city. Life in city is composed of 3 elements: Inhabiting, Working and Relaxing. Travel behavior ties each element and is often called the 4th element of life in city. Our group focuses on the importance of relationship between life and transportation behavior in city.

Our main research themes are traffic calming transport community development, regional transportation planning, tourism management, traffic demand management (TDM), traffic demand Omotenasi (TDO), traffic psychology and behavior, consensus building, and transportation network analysis. Also, urban and regional open space topics considering landscape design and conservation of green space are included.

We also conduct collaborative studies with multiple companies, local governments and regional organizations. The collaborations give us positive experience for future demand and research.



**Hisashi Kubota**

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Saitama University





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