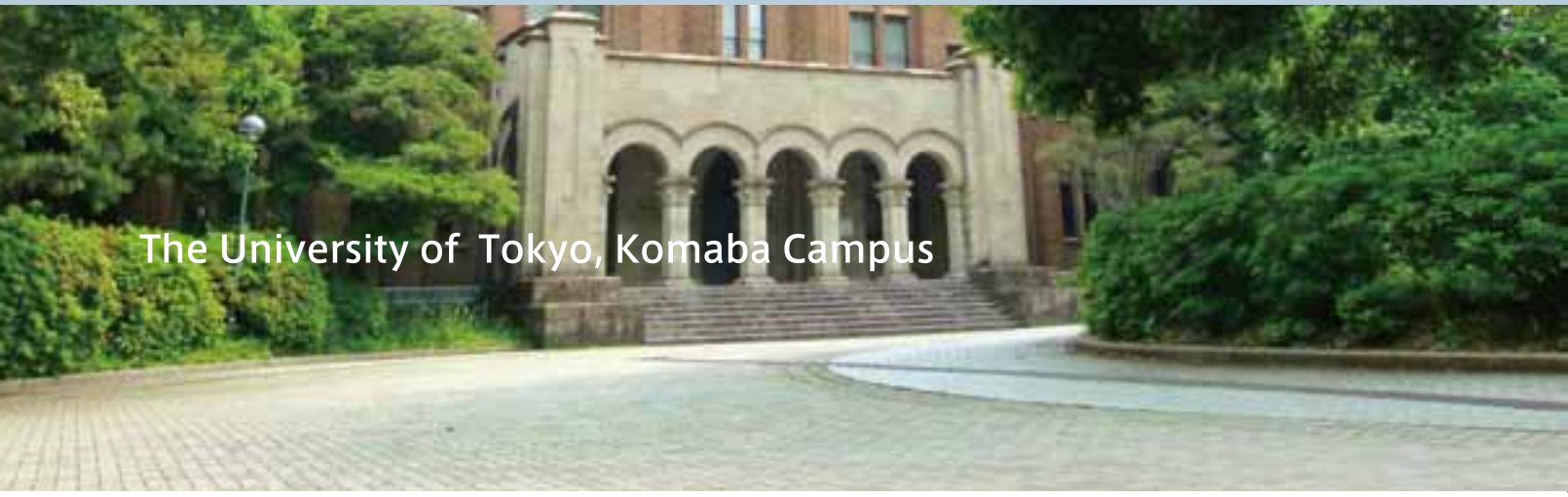
THE UNIVERSITY OF TOKYO

GPES | Graduate Program on Environmental Sciences

Master Course

Ph. D. Course



The University of Tokyo, Komaba Campus

The University of Tokyo (established in 1877) is widely regarded as Japan's Premier academic institution and is consistently ranked as one of the best in Asia. Faculty members conduct a wide range of research while at the same time striving to create a cutting-edge interdisciplinary academic curriculum.

What is now the College of Arts and Sciences was founded at Komaba, Tokyo, in 1949, when the University of Tokyo started instruction under the present system, based on post-war academic reform. Established as an autonomous institution from the very beginning, the College chose to provide, in addition to education for lower division undergraduates in all faculties of the university, its own upper division for third and fourth-year students and, later, its own Graduate School.

The University of Tokyo at Komaba is located in west-central Tokyo. Although only minutes away from the bustling cityscapes of Shibuya and Shinjuku, the campus boasts a peaceful and secluded environment for learning. All GPES classes are held at Komaba, and students enjoy ready access to the museums, art galleries, theaters, and sports and recreational activities that help make Tokyo one of the world's great cities.

Program Overview

The Graduate Program on Environmental Sciences (GPES) is an exciting new advanced level degree program (offered at both Masters and Ph.D. level) at the University of Tokyo. It shares its vision with its undergraduate counterpart, the International Program on Environmental Sciences, one of the PEAK (Programs in English at Komaba) programs, and is likewise delivered entirely in English. Students taking the undergraduate program develop a unique set of skills, allowing them to analyze, critique, propose and define environmental policy from economic, cultural and political viewpoints, based on a platform of basic science and technology, which covers aspects from basic physics and chemistry through to environmental processes such as ecological systems and methods for measuring global material circulation.

The graduate program steps further and deeper, allowing students to choose their area of specialization from a wide range of relevant fields including natural and agricultural sciences, industrial technologies, and social sciences including economics, politics and other related disciplines. The course provides a unique opportunity to work with world experts at the cutting edge, on problems that global society needs to address right now for its future prosperity.

Learning Outcomes

Students graduating from the GPES program will be specialists and professionals

- capable of working internationally in the environment-energy field on the global stage;
- with a systematic understanding of the environment-energy field from both natural and social scientific perspectives;
- who understand and can make judgements on environmental questions on all scales ranging from local to global;
- with a considered and empathetic view of the wide range of different stakeholder viewpoints on environmental issues and who can execute leadership in resolving issues arising from these;
- who can make informed decisions in real time, on site to solve real world problems;
- who are global communicators, capable of addressing both specialists and non-specialists while encompassing the needs of differing cultural groups.

Area 1 Environmental Principles

The area of Environmental Principles is concerned with the fundamental issues of the environment, and approaches them from the perspectives of the humanities (ethics, history, and philosophy) and related sciences. The lectures offered are intended to provide students with opportunities to understand and contemplate the underlying issues of environmental studies and their relationship to science, technology, and society. Foundations for the concept of sustainable development are also explored.

Hashimoto, Takehiko Professor

In the Environmental Principles group, we study and teach basic and fundamental issues of the environment and environmental sciences from the dual perspectives of human and social science and engineering. We take the environment rather more broadly than it is usually treated, in that we consider both natural and artificial aspects. We not only study topics such environmental ethics, but also the impact of technological systems on society. Professor Takehiko Hashimoto and Professor Takuji Okamoto are historians of science and technology and currently study such topics as the history of safety standards in various technological disciplines, and also the history of the electric power industry. Professor Yoshiyuki Hirono and Professor Kohji Ishihara study risk from sociological and philosophical viewpoints. Professor Hiroyuki Yamato and Professor Takashi Mino investigate transportation and water resources from technological perspectives. The Environmental Principles group thus deals with the fundamental issues underlying environmental studies as well as the key fundamental issues for creating a better natural and artificial environment for mankaind.

For more detailed information on this area, please access the following webpage:
http://gpes.c.u-tokyo.ac.jp/faculty-staff/environmental-principles/

Environmental Principles

A map of Yokkaichi area where severe air pollution erupted in the 1960's.


A scene of a seminar by Professor Yoshiyuki Hirono.


The official reports on the accident of the Fukushima Nuclear Power.

Area 2 Management and Policy

Management and Policy deals with social science approaches to environmental issues. Research in this area explores the applications of social science disciplines including economics, law, political science, sociology, and psychology to real world problems with regard to environmental management and policy making.

Maeda, Akira Professor

My research interests include the economic analysis of tradable permits. The tradable permit is one of the policy instruments employed to control the emission of environmental substances. These substances have bad effects on the economy, but at the same time, their emissions are a result of our economic activities. Thus, the control of these emissions is an indicator of government intervention in economic activities, which is not compatible with our belief and confidence in the market-based economy.
A solution to such incompatibility is that the regulator issues permits for private firms to emit the pollutant, and the regulator allows those permits to be tradable among emitters. Such a scheme makes the market mechanism work. The concept was proposed by economists in the late 1960s, having been applied to real world problems in many ways.
I am also interested in topics in economic growth, risks, etc., in the context of policy analysis. There are many exciting areas to explore in front of us.

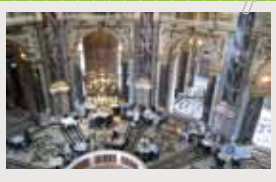
Narita, Daiju Professor

My main research interest lies in the economics of climate change, in particular, theoretical and applied evaluations of economic costs on various aspects of climate change. The research involves application and examination of methodological frameworks of environmental economics, such as risk analysis and economic valuation of non-market ecosystem services, while it also deals with cross-disciplinary collaboration with natural scientists. My other research interests include sustainable development (the environment and development) and energy issues, investigating cases of problems in Africa, Southeast Asia and others.

For more detailed information on this area, please access the following webpage:
http://gpes.c.u-tokyo.ac.jp/faculty-staff/management-and-policy/

Field survey of fish fauna in a tributary of Mikata Five Lakes as a part of a field course.

Using paddy fields as an alternative spawning ground of fish species.



Energy-environmental policy issues are discussed at a forum in Vienna.

Area 3 Measurement and Evaluation

Our environment is composed of many complex physical, chemical and biological systems with which we interact and which interact with one another; the oceans and the atmosphere are two very clear examples. Measurement and Evaluation examines the theoretical principles and models, experimental methods and technologies and the analytical processes necessary to evaluate these systems and their interactions.

Matsuo, Motoyuki Professor

My research interests are in environmental evaluation by the state analysis of elements. Attention has been paid to the chemical states of iron (oxidation states, coordination, magnetic properties, etc.) included in various environmental or geochemical samples. 57Fe Moessbauer spectroscopy is one of the most useful means for characterizing the chemical states of iron in a wide variety of natural samples. This technique has been employed successfully in investigations on airborne particles and estuarine sediments, etc. X-ray absorption fine structure (XAFS) spectroscopy has also been applied to the characterization of iron and other elements. The distribution and movement of elements in the environment are also studied using high sensitivity elemental analyses such as neutron activation analysis, prompt gamma-ray analysis and ICP-MS.

Shefferson, Richard Professor

I am an evolutionary ecologist working on how life histories and symbioses evolve. I typically work on rare and endangered plants, giving my work strong conservation implications. I am particularly fascinated by how the oddballs of the Tree of Life evolve, such as non-photosynthetic or parasitic plants. My students have gone on to study such topics as reintroduction of biologically extinct species, conservation strategy in large African mammals, and the evolution of resistance to toxic metals across the Plant Kingdom.

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http://gpes.c.u-tokyo.ac.jp/faculty-staff/measurement-and-evaluation/

Field work on a ship with a sediment core sampler.

A parasitic wasp, Anisopteromalus calandrae, parasitizing a host larva or pupa inside a seed.

The experimental system with the parasitic wasp, A. calandrae, and two seed beetles.

Area 4 Materials Systems and Dynamics

Materials, Systems and Dynamics is based on the physical and biological sciences. It focuses on the ways in which individual materials are composed and interact with each other to produce complex systems, which include man-made processes, the earth, its atmosphere and the universe. Understanding the structure and dynamics of these systems allows us not only to predict their behavior, but also to influence and ultimately control them.

Oki, Taikan Professor

I myself have major research interests in global hydrology and world water resources. All organisms, including humans, require water for their survival. Therefore, ensuring an adequate water supply is essential for human well-being, and is currently recognized as one of the basic human rights. Although warnings of increasing water scarcity in the world are common, water is a naturally circulating resource that is constantly recharged. In addition, water saving and desalination technologies are developing, and food trade can alleviate water shortage for food production. Better water resources management based on natural and social sciences would solve current water issues and enable sustainable water use anywhere on this planet.

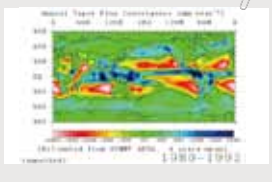
Furthermore, water, food, and energy are intimately linked physically, spatially, and temporally. It is critically significant to synthesize the knowledge of how to manage water, food, and energy wisely, in order to develop sustainability in societies. The education and research in Area 4 Materials Systems and Dynamics supports graduate students who will lead such interdisciplinary science and practice around the world.

For more detailed information on this area, please access the following webpage:

http://gpes.c.u-tokyo.ac.jp/faculty-staff/materials-systems-and-dynamics/

Field survey on the integrated water management.

Technical excursion with water-related faculties in the University of Tokyo.



Annual mean atmospheric water vapor convergence of the globe.

Area 5 Energy and Resources

Energy and Resources is one of the most important underlying subjects in environmental science. The courses offered are designed for students to review energy technologies and resources that include fossil fuels (e.g. oil, coal, and natural gas), renewables (e.g. photovoltaic, wind power, etc.), and advanced generation technologies (e.g. nuclear power), as well as to explore the engineering details of these methods.

Okada, Yoshitaka Professor

In the years to come, solar power will make up a significant portion of the total power supply in Japan and the rest of the world. Solar power provides an alternative to coal-generated electricity, significantly reducing greenhouse gas emissions.
My laboratory focuses on developing innovative photovoltaic technologies in order to boost the energy conversion efficiency of solar cells. The commercial roof-top solar panels available today are at around 15 - 20% efficient, but new semiconductor materials and quantum nanostructures are being explored to realize efficiencies towards 45 - 50%. Our research includes high-quality crystal growth of new thin-film semiconductors and nanostructures and photon trapping and anti-surface-reflection techniques using nano-texturing and patterning. These advances will allow the development of high-efficiency next-generation solar cells such as multi-junction tandem solar cells and quantum dot-based intermediate band solar cells.

Kansha, Yasuki Professor

I am a process system engineer specializing in design of new process systems among industries and communities from the view point of energy saving or high energy efficiency. To design such processes, we investigate fundamental phenomenon of materials by experiments and construct models of the processes to optimize them in our group. Furthermore, their impacts to the society and environments are analyzed by simulations aiming to create a sustainable society.

For more detailed information on this area, please access the following webpage:
http://gpes.c.u-tokyo.ac.jp/faculty-staff/energy-and-resources/

Energy and Resources

Flexible solar panels are lightweight and versatile making them convenient and attractive for wide applications.

Next-generation compact wind turbines are important topics of renewable energy research.

Students can carry out project research using the state-of-the-art equipments and technology.

Area 6

Health and Security / Urban Planning Technology

For human beings, the environment has many important aspects, like its ability to keep us alive, healthy, safe and free of fear. The area of Health and Security deals with many aspects from this perspective, including the risk and safety analysis of food production, processing and distribution, food science, health science, the dynamics of populations, landscape ecology, and social-ecological systems. Also discussed are ways in which our environment can be nurtured and enhanced in a beneficial manner and how ecological and social sustainability can be achieved. In this area, Urban Planning Technology is also discussed in the context of delivering smooth traffic flow and the mitigation of society from various disasters.

Yamakawa, Takashi Professor　Health and Security

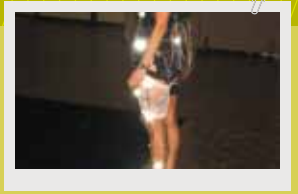
Research in the laboratory of plant biotechnology focuses on the genetic improvement of crops that can be cultivated on poor soil and with high nutritional value. The laboratory also employs genetic engineering to create fruits, leafy vegetables and tubers that function as edible vaccines that can stimulate the immune system in its role of protecting humans and animals from infectious diseases. Laboratory projects are large in scale involving everything from laboratory experiments to fieldwork, food safety and risk management.

Oguchi, Takashi Professor　Urban Planning Technology

My research interests lie in the field of traffic engineering; highway traffic capacity, geometric design and driving behavior, ITS (Intelligent Transport Systems), and impact studies of traffic management and control. I am working on the CO_2 emission model combined with an urban road traffic network simulation considering the effects of traffic congestion. I am also working in the field of driving behavior model development, to evaluate the impact of ACC (Advanced Cruise Control). Recently, my major research activity is in the field of urban traffic signal control.

For more detailed information on this area, please access the following webpage:
http://gpes.c.u-tokyo.ac.jp/faculty-staff/health-and-security/

Surveying equipped car probing Tsunami-disaster suffered area.



The subject in Motion Capture Experiment.

The sprint start experiment by Motion Capture System.

How to apply / Support

Screening Procedure

Enrolment onto the GPES program is available twice a year: in April and September. Two rounds of application take place each year and are referred to as Schedule 1 and Schedule 2. In order to apply, there is no need to visit Japan. You will need to provide us with the various documents listed on the "How to apply" section of our website. We will screen your documents and, if appropriate, will offer you an interview by internet videoconference. If you are offered a place on the program, you may start your course in September (Schedule 1) or April (Schedule 2) of the next calendar year.

First Stage	Second stage	Third stage
Schedule 1 (applications November) Schedule 2 (applications June / July)	Schedule 1 (interviews by end of December) Schedule 2 (interviews by end of August)	Schedule 1 (results by end of January) Schedule 2 (results by end of September)
DOCUMENT SCREENING	PERSONAL INTERVIEW (if applicable)	ANNOUNCEMENT OF SUCCESSFUL APPLICANTS

For full details on how to apply, please visit http://gpes.c.u-tokyo.ac.jp/how-to-apply/index.html

Scholarships

The Japanese Government provides scholarships to international students wishing to study in Japan through the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Applications are made through the Japanese Embassy in your home country. For more information on how to apply for a MEXT scholarship, please visit the following website:
https://www.studyjapan.go.jp/en/toj/toj0302e.html

Information on registering for other scholarships that become available to students already enrolled onto the GPES program can be found on the Global Komaba website:
http ://www. globalkomaba.c.u-tokyo.ac.jp/en/index.html

The Japan Student Services Organisation (JASSO) also provides a useful booklet on scholarship opportunities which can be downloaded from the following website:
https://www.jasso.go.jp/en/study_j/scholarships/brochure.html

Student Support System

There are a number of student support systems available on the Komaba Campus for graduate students on the GPES program.
(For more details visit the Global Komaba website : http://www.globalkomaba.c.u-tokyo.ac.jp).

1. International Student Section

The International Student Section offers services to international students, such as visa maintenance, scholarships, housing, etc.

2. Globalization Office / International Center Komaba Office

The Globalization Office and the International Center Komaba Office support students on the Komaba Campus at all stages of their university career. The offices arrange the reception and support for new and existing international students, and the services include after-arrival care, organizing academic and exchange events, advice on study abroad, tutoring, etc. The team is on hand to help students with inquiries regarding student life.

3. International Center Komaba Office, Counseling Section

A professional counselor is available to assist with any difficulties or problems that may occur in campus life.

4. GPEAK Office (Counter No. 2, 1st floor of the Administration Building)

The GPEAK Office deals with academic administration matters such as course enrolment, class registration, the course credit system etc.

5. Komaba Health Service Center

The Komaba Health Service Center provides diagnoses and treatment as well as health counseling by specialists in the areas of internal medicine, orthopedics, dentistry, dermatology, psychiatry along with a travel clinic. The center also offers annual health checkups and various healthcare-related services.

Tuition

The current registration and tuition fees are:
Enrollment fee: JPY 282,000 (subject to change)
Annual tuition fees: Masters JPY 535,800, Ph.D. JPY 520,800 (subject to change)

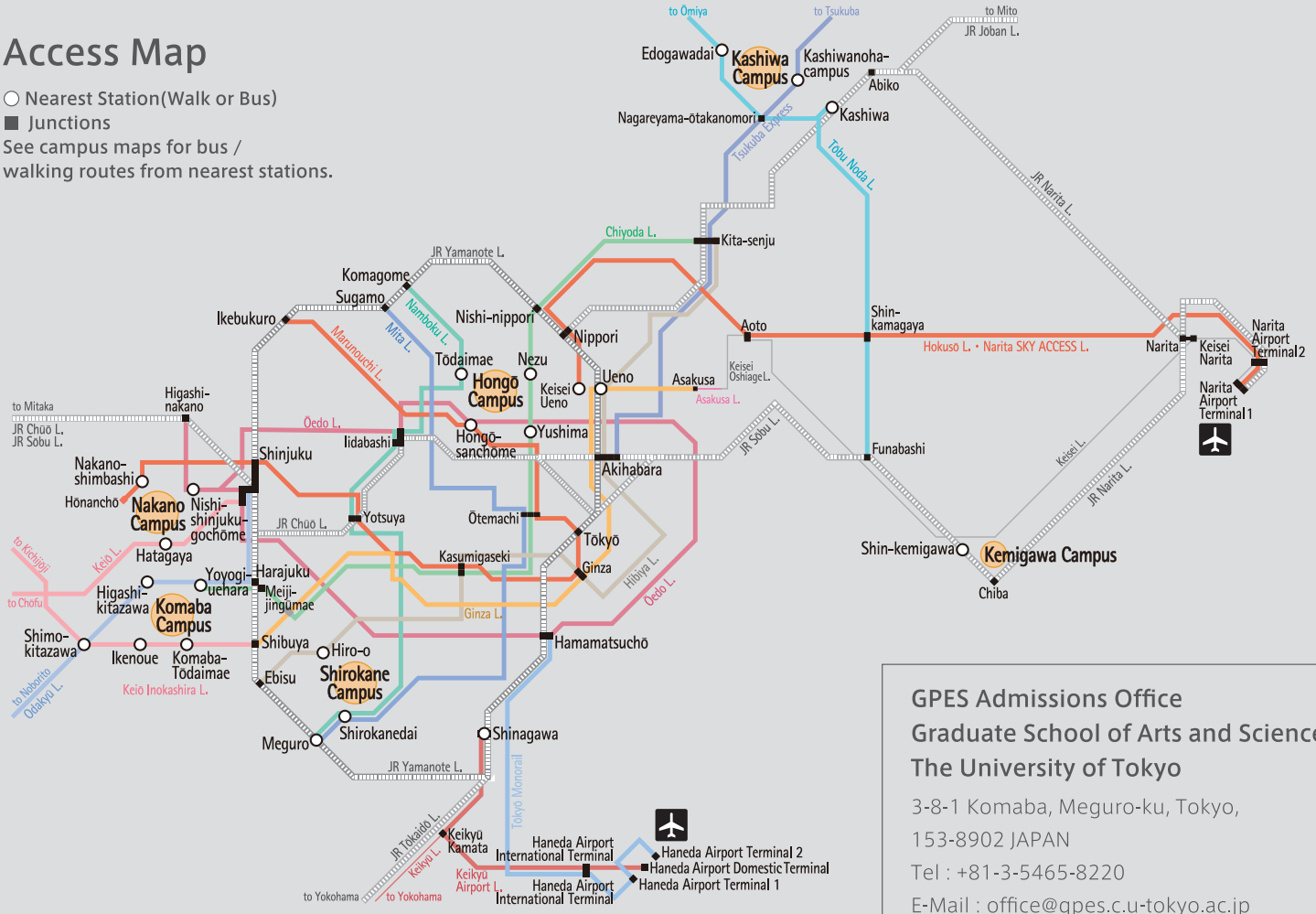
Accommodation

The University has housing available for international students at a number of locations across Tokyo. For further details on application procedures and eligibility requirements, please visit the University's Housing Office webpage. This page also provides information on private accommodation.
http://www.u-tokyo.ac.jp/en/administration/housing-office/



Access Map

○ Nearest Station(Walk or Bus)
■ Junctions
See campus maps for bus / walking routes from nearest stations.



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