BACHELOR'S PROGRAM IN GREEN SCIENCE

DEPARTMENT OF MATERIALS AND LIFE SCIENCES

グリーンサイエンスコース　物質生命理工学科

BACHELOR'S PROGRAM IN GREEN ENGINEERING

DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES

グリーンエンジニアリングコース　機能創造理工学科

FACULTY OF SCIENCE AND TECHNOLOGY, SOPHIA UNIVERSITY

上智大学 理工学部

FACULTY OF SCIENCE AND

GREEN SCIENCE PROGRAM

DEPARTMENT OF MATERIALS AND LIFE SCIENCES
(DEGREE: BACHELOR OF SCIENCE IN MATERIALS AND LIFE SCIENCES)

GREEN ENGINEERING

DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES
(DEGREE: BACHELOR OF SCIENCE IN ENGINEERING AND APPLIED SCIENCES)

PREPARING YOUNG TALENT TO BECOME NEXT-GENERATION SCIENTISTS AND ENGINEERS IN GLOBAL COMMUNITY

A NEW ERA OF SCIENCE AND TECHNOLOGY SERVING THE PEOPLE AND THE PLANET

Students at the Faculty of Science and Technology of Sophia University are deeply immersed in their own areas of study while freely interacting with other fields to develop a sensitivity, knowledge, and ability to integrate these fields and move fluidly in thought between humanities and the sciences. The goal is to produce graduates with “crossdisciplinary knowledge” that enables them to participate in unraveling the complex problems challenging society today. The curriculum is grounded in the basics of science and technology while keeping up with the innovations and increasing diversity of industrial technology, enabling students to acquire a crossdisciplinary knowledge that includes the knowledge and wisdom of caring for people and the environment. To be able to fully leverage this crossdisciplinary knowledge, the students must understand the fundamentals of all areas of science and technology, and in order to be able to freely move between fields, each one must build a firm foundation in her or his own area of study. Thus, each department has key themes that indicate the scope of study and connect to the selection of a specialty. To build crossdisciplinary knowledge, students must select courses of study from among the numerous fields that are classified by these key themes and that are compatible with their primary field of interest. The small number of students typical of this university gives students ample access to professors to discuss the selection of courses and to decide the best path for their specialty.

MESSAGE FROM THE DEAN

TOMOHARU SHIBUYA, Dean of the Faculty of Science and Technology

This year marks the 12th anniversary of the establishment of the Green Science and Green Engineering Courses in the Faculty of Science and Technology, Sophia University. Because all subjects in both courses are taught in English, students can enroll in a variety of subjects including laboratory subjects and conduct undergraduate research in English. The main appeal of these courses is small-group tutorials where individual students can receive detailed instructions from mentors. In science and engineering departments in Japanese universities, there are few degree-granting science and technology courses that offer subjects only in English. For this reason, both courses have attracted a large number of students from many countries and regions around the world.

In the Green Science Course, students learn the basics of chemistry, applied chemistry, physics, and biology as outlined in the curriculum of the Department of Materials and Life Sciences. In the Green Engineering Course, students learn the basics of physics, mechanical engineering, and electrical/electronic engineering as detailed in the curriculum of the Department of Engineering and Applied Sciences. In the first and second years of both courses, students study extensively basic subjects in science and engineering to acquire the academic skills necessary to learn specialized subjects. Each course provides specialized subjects tailored to students’ future career plans, with some offered even in the second year. Students take mainly specialized subjects in their third year and receive specific guidance for undergraduate research from the laboratory advisor in their fourth year. On top of these, graduate programs in the Green Science and Engineering Division, which are offered only in English and lead to master’s and doctoral degrees, are also available in the Graduate School of Science and Technology, enabling students to equip themselves with even higher expertise.

Students who wish to learn in Japanese have several opportunities to do so. Students can learn with Japanese-course students when they enroll in laboratory subjects or conduct undergraduate research, which can lead to deepening exchanges with Japanese-course students. In addition, as most faculties are located in the Yotsuya Campus, active interaction among students from different faculties or departments is possible, allowing students to experience Japanese culture and daily campus life firsthand.

We at Sophia University’s Faculty of Science and Engineering have prepared a comprehensive curriculum and an exciting learning environment for students from abroad. Both the faculty and the Japanese-course students eagerly look forward to having you with us.

TECHNOLOGY
PROGRAM



PROGRAM FEATURES

INTERNATIONAL UNDERGRADUATE PROGRAMS FOR ENVIRONMENTAL SCIENCE AND TECHNOLOGY

To meet the diverse needs of internationalization, the faculty added two new programs taught entirely in English as part of its regular curriculum in September 2012. The Green Science Program offered by the Department of Materials and Life Sciences and the Green Engineering Program offered by the Department of Engineering and Applied Sciences each has an enrollment capacity of 25 students. Students enrolled in those programs are required to complete all classes, take examinations, submit reports, undergo research guidance, and submit their undergraduate thesis in English.

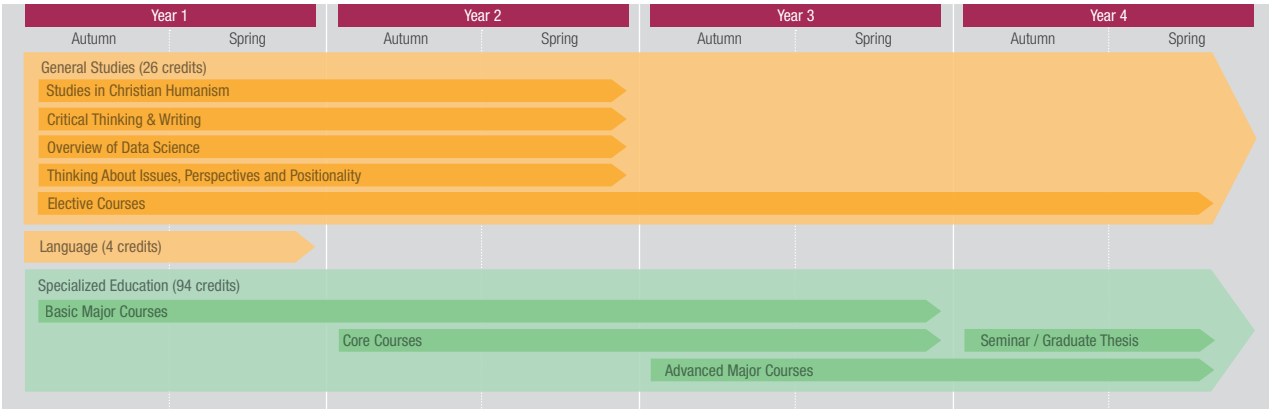
"GREEN SCIENCE" program, offered by Department of Materials and Life Sciences, is designed to acquire fundamental knowledge of substances, and to overcome environmental issues at the atomic and molecular levels based on green material sciences.

"GREEN ENGINEERING" program, offered by Department of Engineering and Applied Sciences, is designed to learn electrical and mechanical engineering skills to help develop energy conservation technology, efficient power generation and distribution and power transmission.

CURRICULUM

※There is a possibility that the English-taught programs will be reorganized starting in the 2024 academic year.
Please check our University website for the latest information.

MODEL



COURSE LIST

Faculty of Science and Technology

	Course Title	Cr.
Faculty of Science and Technology Common Subject Group Ⅰ	INTRODUCTION OF SCIENCE AND TECHNOLOGY	2
	MATHEMATICS A (LINEAR ALGEBRA)	2
	MATHEMATICS B (CALCULUS)	2
	MATHEMATICS EXERCISE 1	1
	BASIC PHYSICS I	2
	BASIC CHEMISTRY	2
	BASIC BIOLOGY	2
	BASIC INFORMATICS	2
	EXPERIMENTS & EXERCISE OF BASIC SCIENCE	1
	ENGL. FOR SCI / ENGINEERING (ENVIRONMENT)	2
Faculty of Science and Technology Common Subject Group Ⅱ	BASIC PHYSICS II	2
	MATHEMATICS C1 (STATISTICAL DATA ANALYSIS)	2
	MOLECULAR BIOLOGY	2
	MATHEMATICS B2 (CALCULUS OF SEVERAL VARIABLES)	2
	BASIC DIFFERENTIAL EQUATIONS	2
	INORGANIC CHEMISTRY (ANALYTICAL CHEMISTRY)	2
	ORGANIC CHEMISTRY	2
	PHYSICAL CHEMISTRY	2
	FOURIER & LAPLACE TRANSFORMS	2
	THERMODYNAMICS	2
	CELL BIOLOGY	2
	INTRODUCTION TO QUANTUM MECHANICS	2
	ATOMIC & MOLECULAR SCIENCES	2
	GEOSCIENCE	2
	ATMOSPHERIC CHEMISTRY	2
	ELECTROMAGNETISM	2
	SCIENCE, TECHNOLOGY AND ENVIRONMENT	2
	FUNDAMENTAL BIOCHEMISTRY	2
	TECHNOLOGY & INNOVATION -CAREER DEVELOPMENT-	2
	CHEMISTRY OF MATERIALS	2
	APPLIED MECHANICS	2

Department of Materials and Life Sciences (Green Science)

	Course Title	Cr.
Department Core Courses	MATERIALS AND LIFE SCIENCES (PHYSICS)	2
	MATERIALS AND LIFE SCIENCES (CHEMISTRY)	2
	MATERIALS AND LIFE SCIENCES (BIOLOGY)	2
	MATERIALS AND LIFE SCIENCES LAB. A	1
	MATERIALS AND LIFE SCIENCES LAB. B	1
	MATERIALS AND LIFE SCIENCES LAB. C	1
	CHEMISTRY LAB. 1	1
	CHEMISTRY LAB. 2	1
	PHYSICAL CHEMISTRY LAB.	1
	BIOLOGY LAB. 1	1
	BIOLOGY LAB. 2	1
	BIOLOGY LAB. 3	1
	SEMINAR 1	1
	SEMINAR 2	1
	GRADUATION RESEARCH 1	1
	GRADUATION RESEARCH 2	1
Department Specialized Courses	ATOMIC AND MOLECULAR SPECTROSCOPY	2
	INSTRUMENTAL ANALYSIS	2
	ORGANIC AND NATURAL PRODUCT CHEMISTRY	2
	ENVIRONMENTAL ANALYTICAL CHEMISTRY	2
	GREEN CHEMISTRY	2
	RADIATION PHYSICS AND CHEMISTRY	2
	CATALYSIS CHEMISTRY	2
	THEORY-AIDED MOLECULAR DESIGN	2
	QUANTUM REACTION DYNAMICS	2
	TOPICS OF PLANT SCIENCE	2
	STRUCTURAL CHEMISTRY	2
	SEPARATION CHEMISTRY IN ANALYSIS	2
	METALLIC AND ELECTRONIC MATERIALS	2
	POLYMER CHEMISTRY	2
	RESEARCH TOPICS IN LIFE SCIENCES	2
	RESEARCH TOPICS IN ORGANIC AND INORGANIC CHEMISTRY	2
	RESEARCH TOPICS IN PHYSICAL CHEMISTRY AND CHEMICAL PHYSICS	2

Department of Engineering and Applied Sciences (Green Engineering)

	Course Title	Cr.
Department Core Courses	ENGINEERING AND APPLIED SCIENCES 1	2
	ENGINEERING AND APPLIED SCIENCES 2	2
	ENGINEERING AND APPLIED SCIENCES 3	2
	ENGINEERING AND APPLIED SCIENCES LAB. 1	1
	ENGINEERING AND APPLIED SCIENCES LAB. 2	1
	GREEN ENGINEERING LAB. 1	1
	GREEN ENGINEERING LAB. 2	1
	GREEN ENGINEERING LAB. 3	1
	TOPICS OF GREEN ENGINEERING 1	1
	TOPICS OF GREEN ENGINEERING 2	1
	GRADUATION RESEARCH 1	1
	GRADUATION RESEARCH 2	1
Department Specialized Courses	THERMAL ENERGY CONVERSION1	2
	FLUID ENERGY CONVERSION1	2
	ENERGY & MATERIALS1	2
	NUCLEAR ENERGY ENGINEERING	2
	MOTOR DRIVE SYSTEMS	2
	CLEAN ENERGY	2
	SIMULATION ENGINEERING	2
	COMMUNICATION AND NETWORK ENGINEERING	2
	TOPICS OF GREEN ENGINEERING 3	2
	AIRCRAFT DESIGN WITH MECHANIC OF FLIGHT	2
	PHYSICS AND ENGINEERING OF ELECTRONIC DEVICES	2
	POWER ELECTRONICS	2
	ELECTRIC POWER SYSTEM ENGINEERING	2
	OPTICS	2

MESSAGE

FROM TEACHING STAFF

JIRO KONDO Professor (Class Advisor of Green Science)

Today, the ability to combine knowledge and skills from different disciplines to generate new ideas and results is increasingly required. For example, in the drug discovery research in which I am involved, chemistry knowledge and techniques are essential for synthesizing drugs, but life science experiments are necessary to confirm their efficacies, and physics research methods are needed to understand the interaction between drugs and their target molecules. Furthermore, computer science, artificial intelligence, and mathematical statistics are actively used in the design of modern pharmaceuticals. The Green Science Program focuses on fostering human resources who can create new value by combining knowledge and skills from different disciplines. In small classes made up of students from diverse backgrounds, you can learn both basic and advanced knowledge and skills from faculty members who are experts in their respective fields.

TADASHI ADACHI Professor (Class Advisor of Green Engineering)

Address the environmental issues confronting humanity and achieve the SDGs. Many of you are aware of this. Among many ways to achieve, in our Green Engineering course, students can learn the fundamentals of creating new science and technology that is compatible with the environment, based on physics, mechanical engineering, and electrical and electronics engineering. For example, students can learn from the basics to applications, such as research on the synthesis of new materials in which Japan excels and research to improve energy efficiency and environmental performance. In addition, Sophia University, one of Japan's leading international universities, is the place where you can not only gain scientific knowledge but develop cultural literacy as well. When you graduate, your knowledge and skills will be boosted overall, and you will be equipped with a solid foundation to become a global leader.

TAD GONSALVES Professor (Teaching courses in Artificial Intelligence and programming)

Our Science & Technology Faculty is constantly renewing the curriculum in keeping pace with the challenging Data Science & AI revolution. Even non-science students are encouraged to learn data analysis and programming. Computer Science, Artificial Intelligence, and Programming courses in the Green Science curriculum will provide the students with cutting-edge data analysis and programming skills necessary to survive in the ICT revolution and carve a successful career. AI and machine algorithms used in visual perception, speech recognition, decision-making, and language translation are making great progress day by day. However, these algorithms, trained on vast amounts of data to make predictions, require large-scale computing resources, and consume massive amount of electrical power to deliver results. We are far from developing a green computing technology. Students from the Green Science & Engineering Program will find it a challenge to think over this problem and contribute towards creating a greener computing environment.

FROM STUDENTS

GIULI NAGAI Student (Green Science Program)

In addition to the privileged location at the heart of Tokyo, my decision to enroll at Sophia University was driven by the Green Science program's interdisciplinary curriculum and the diverse international atmosphere on campus. I really enjoy the small class sizes, the professors' captivating enthusiasm for their respective fields, and the overall comprehensive education where students obtain a solid understanding of mathematics, physics, biology, chemistry, and informatics, all viewed through the lenses of environmental studies and sustainability. Beyond the academic setting, Sophia University provides an extensive range of extracurricular activities that enhances the campus life experience by providing opportunities to apply classroom knowledge and develop a plethora of soft skills through collaboration and engagement with other university departments, such as FLA and SPSF. Having organized numerous sustainability awareness events on campus and initiating my thesis research on the impact of environmental regulations on carbon emissions, I believe that students genuinely experience the freedom to pursue their individual interests within the program. Once I graduate, I hope to move back to the United Stated to pursue a Master in Environmental Management to refine my potential to make meaningful impact in the field of environmental sustainability.

HAO CHENQI Student (Green Engineering Program)

Choosing Sophia University was in a sense a coincidence. I was selected as a volunteer for the 2020 Tokyo Olympics. During the orientation session in Tokyo, I accidentally came to the vicinity of Sophia University and learned about it for the first time. Later, due to the outbreak of the epidemic, the plan was changed by going to Japan where it is closer to homeland. Naturally, Sohpia was taken into consideration. Later, I found out that Sophia provided a wide range of science and engineering courses, which were very suitable for my needs, so I came to Sophia.

The campus of Sophia University is located in the core area of Tokyo, adjacent to the royal garden. Although the campus is relatively small, it is fully functional and can meet the needs of students.

After graduation, I plan to continue my master's studies. The current plan is to travel to Europe to continue research in the field of aerospace engineering. But at the same time, I will also try to find some jobs that I am interested in.

The Green Engineering course offers a wide range of course and research options, allowing students to try more in the first two years of college to determine their true interests. The school also allows third or even second year students to participate in laboratory research trials to learn the skills required for engineering research in advance. In addition, due to being taught entirely in English, graduates will also have competitiveness, whether in Japan or continuing to study abroad.

INFORMATION

ADMISSIONS

Academic Year

Entry to Sophia: September

There are two semesters, beginning in September and April. Each semester consists of 15 weeks of classes.

Application Schedule

Applications are accepted twice a year.

1 First Application

- Application Period (on-line): Mid-November – Early-December
  Application materials must reach Sophia Admissions Office by the appointed date.
- Notice of Results: Mid-February

2 Second Application

- Application Period (on-line): Mid-March – Early April
  Application materials must reach Sophia Admissions Office by the appointed date.
- Notice of Results: Early June

For details, please refer to: https://adm.sophia.ac.jp/eng/admissions/ug_p/en_ug/fst

For more information

SCHOLARSHIPS (As of 2024)

A scholarship that students can apply for at the time of admission application.

Sophia University New Student Scholarship: Successful applicants will receive the tuition reduction scholarship that covers either one-third, one-half or the full tuition fee for the first year.

The application form for the scholarship is available at https://piloti.sophia.ac.jp/eng/scholarships1/scholraship_e0005/

Other scholarships are also available after the entrance to the University.

For more information, please refer to the website: https://piloti.sophia.ac.jp/eng/scholarships1/

For more information

HOUSING

Sophia University has several off-campus dormitories and offers affiliated housing options.

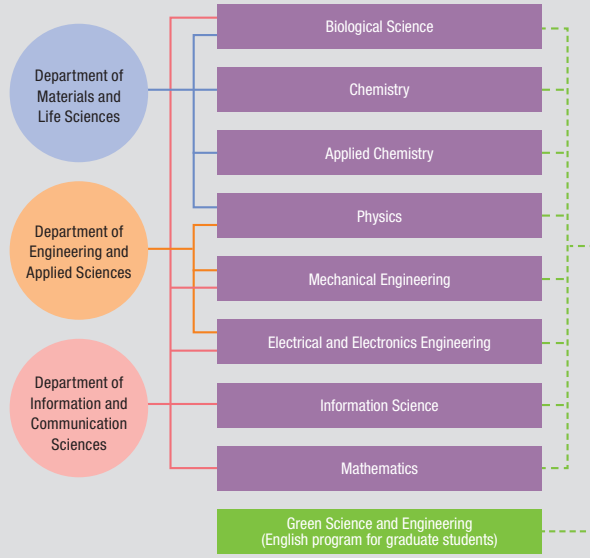
For more information, please refer to the website: https://piloti.sophia.ac.jp/eng/housing/

For more information

GRADUATE SCHOOL OF SCIENCE AND TECHNOLOGY

https://www.st.sophia.ac.jp/english/graduate-studies/index.html

The Graduate School of Science and Technology has one interdisciplinary graduate program with nine divisions.
The interdisciplinary graduate program aims to be both specialized, to bring to light new scientific information and technological developments in all the academic divisions, and interdisciplinary, to foster a common regard for the effects of such developments on humankind, the society, and the global environment.
The first stage of the program is designed to maintain consistency with undergraduate instruction by combining crossdisciplinary knowledge and specialty with the objective of cultivating highly educated individuals who can contribute to the well-being of humankind and the society. The second stage of the program aims to produce researchers who can execute independent research in one or more academic fields.



CAREER PATH

Undergraduate Students

- TPN Flexpak Co., Ltd.
- UD Trucks Corp.
- ALPSALPINE Co., Ltd.
- Internet Business Japan Co., Ltd
- AUTEL Intelligent Technology Corp., Ltd
- OPT, Inc.
- KOEI Tecmo Holdings Co., Ltd
- DIVA Corp.
- MITSUBISHI Corporation Life Science Limited
- MITSUBISHI Electric Corp.
- HINO Motors, Ltd.
- CMIC Holdings Co., Ltd.
- LINTEC Corp.
- SEKISUI Medical Co., Ltd.

Graduate Students: Master's Program

- UD Trucks Corp.
- BOSCH Corp.
- RAKUTEN Group Inc.
- RAKUTEN Mobile Inc.
- SHISEIDO Co., Ltd.
- IMI Critical Engineering
- Air Liquide Global E&C
- COTO World Inc.
- JFE Steel Corp.
- TERUMO Corp.
- MAZDA Motor Corp.
- HGST Japan
- KPMG Ignition Tokyo
- AVTEL
- San-Ei Gen F.F.I.,Inc
- TATA Consultancy Services Limited

Graduate Students: Doctoral Program

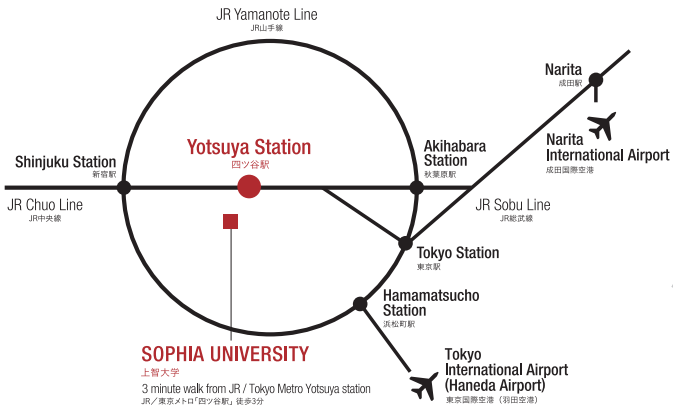
- Sophia School Corporation
- Harbin Engineering University
- Bandung Institute of Technology
- MI-6 Ltd.
- BOSCH Corp.
- Sophia University Junior College Division
- Fukui Prefectural University

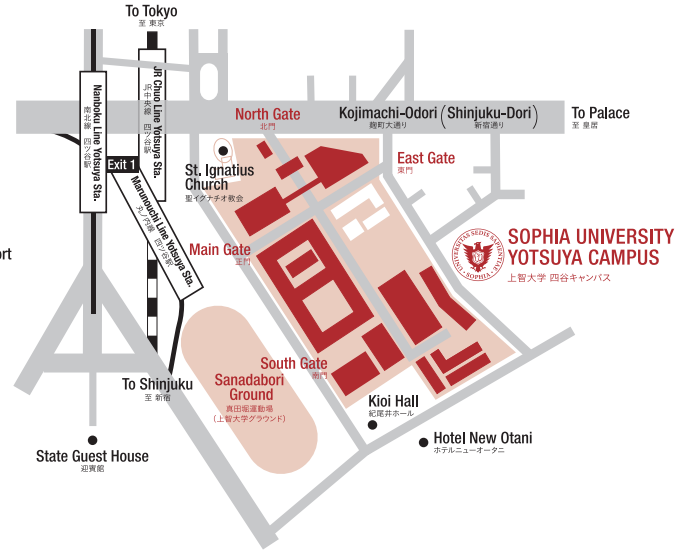
RESEARCH TOPICS

https://www.st.sophia.ac.jp/english/

The thesis research supervisor can be chosen from among faculty members of the Graduate Program in Science and Technology.
Information about the disciplinary specialties and research interests of faculty members are available on the Graduate Program in Science and Technology website:

YOTSUYA CAMPUS ACCESS GUIDE





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