Guidelines for Application 2024

English-Based Master's Program

Mathematics

Physics

Chemistry

Biology

Planetology

The Graduate School of Science provides information regarding the entrance examination on the "Admission" page of our website (http://www.sci.kobe-u.ac.jp/). Updates on current admission details, such as postponements and change of examination contents, will be made available, depending on possibly other factors, such as weather conditions. Please check this website and Kobe University's official Twitter account (@kobeU_sci) for updates.

Graduate School of Science, Kobe University

The Graduate School of Science, Kobe University, was established as a result of the reorganization of the Graduate School of Science and Technology in April 2007. The Graduate School of Science has five departments offering both Master's and Doctoral Programs: Mathematics, Physics, Chemistry, Biology, and Planetology.

A Master's Degree of Science will be granted upon completion of the Master's Program, and a Doctoral Degree, either a Dr. of Science or a PhD, will be granted upon completion of the Doctoral Program.

English-Based Degree Program
The Graduate School of Science, Kobe University offers courses in which students can obtain master's degrees by taking classes conducted entirely in English.

http://www.sci.kobe-u.ac.jp/english/admission.htm

For inquiries, please contact:
Kyomu-gakusei-kakari (Section of Academic Affairs)
Graduate School of Science, Kobe University, 1-1, Rokkodai-cho, Nada-ku, Kobe 657-8501
TEL: 078-803-5767 e-mail: sci-kyomu@office.kobe-u.ac.jp

http://www.sci.kobe-u.ac.jp/english
(Web page of the Graduate School of Science, Kobe University)

http://www.math.sci.kobe-u.ac.jp/index.html (Department of Mathematics)

http://www.phys.sci.kobe-u.ac.jp/index_e.html (Department of Physics)

http://www.chem.sci.kobe-u.ac.jp/en/ (Department of Chemistry)

http://www.edu.kobe-u.ac.jp/fsci-biol/index_en.html (Department of Biology)

http://www.planet.sci.kobe-u.ac.jp/index_e.html (Department of Planetology)

1. Number of Students to Be Admitted

Department	Number of students to be admitted
Mathematics	A Few People
Physics	A Few People
Chemistry	A Few People
Biology	A Few People
Planetology	A Few People

2. Eligibility for Application

Applicant must satisfy all of the following requirements,

(1) Applicants must satisfy at least one of the following requirements and receive adequate recommendation from the relevant university or organization

a) Those who are currently enrolled in or graduated from Kobe University.
b) Those who are currently enrolled in or graduated from universities with which the Graduate School of Science has Academic Exchange Agreements, or from universities which have previous exchange arrangements with Kobe University.
c) Those who have established close communication with faculty members of the Graduate School of Science and are recognized as eligible by the Graduate School of Science.
d) Those who have secured a foreign government or private scholarship for their research stay in Japan.

(2) Those who have obtained consent from their intended supervisor of the Graduate School of Science who will supervise their studies upon enrollment.

(3) Those who can acquire "student" residence status at time of enrollment.

(4) Applicants must satisfy at least one of the following requirements.

a) Those who have completed 16 years of school education or will complete it by March 31, 2024, awarded in a foreign country.
b) Those who have completed 15 years of school education or will complete it by March 31, 2024, awarded in a foreign country, and are recognized by the Graduate School of Science at Kobe University as having earned recognized credits with excellent grades.
c) Those who are recognized as having scholastic abilities equivalent or superior to graduates of university, as assessed through qualification screening by the Graduate School of Science, and who are 22 years of age or older by March 31, 2024.

(Note 1) Applicants who intend to apply in accordance with qualifications (4)-b) or c) must refer to Page 9, "*Preliminary examination of eligibility 2.(4)-b) or (4)-c)"
Applicants who satisfy (4)-c), are those who have graduated from a junior college, a specialized vocational higher college, a school of the miscellaneous category or other educational institutions.
(Note 2) For any questions concerning the application procedures, please contact the Student Affairs Office/Graduate School of Science. e-mail: sci-kyomu@office.kobe-u.ac.jp
(Note 3) You cannot apply at the same time for this entrance examination and any of the other ones for the Master's course of the Graduate School of Science which will be conducted on the same day.

3. Application Period

Department	Period of Application
Physics	From Tuesday, June 13 through Friday, June 16, 2023
Mathematics Chemistry Biology	From Monday, July 3 through Thursday, July 6, 2023
Planetology	From Tuesday July 25 through Friday, July 28, 2023

When submitting application documents in person, delivery hours/office hours are 9:00-12:00, 13:00-17:00.

4. List of Application Documents to Submit

(1) Applicants must submit the following application documents.

*mark –Please fill in using form prescribed by the Graduate School.

*① Application Form

This should be completed in the format specified. Use the CV on the reverse side of the application.

*② Identification Card for the Examination and Administrative Record File

This should be completed in the format specified.

③ Photograph

Two photographs (4cm x 3cm) taken within the past three months, which should be pasted on the identification card for the examination and the administrative record file.

④ Academic Transcript

This must be issued by the dean or the president of the applicant's graduate school.

Applicants applying from within Kobe University are not required to submit this certificate.

⑤ Graduate/Completion (expected) Certification

This must be issued by the dean or the president of the applicant's graduate university that the applicant attends or has attended.

Applicants applying from within Kobe University are not required to submit this certificate.

⑥ Application Fee -30,000 Yen

Please refer to (2) Payment for the examination fee. Application fee should be paid with a payment form at a post office or by credit card, etc.

Japanese Government Scholarship Students are exempt from this requirement.

⑦ Certificate of Monbukagakusho (MEXT) Scholarship Student

Applicants currently studying under a Japanese Government Scholarship must provide a certificate proving such status (issued by the university in which the student is currently enrolled).

⑧ Letter of Recommendation

Recommendation 1 – The letter must be issued by the dean of faculty.

Recommendation 2 – The letter must be issued by an academic professor of the applicant's attended or attending institution.

(1, 2 – Applicants applying within Kobe University are not required to submit this Letter of Recommendation.)

Recommendation 3 – If you are employed at a public agency or company at the time of application, submit a Letter of Recommendation from your immediate superior.

*⑨ Address Label

Screening results and documents for admission procedures will be sent to applicants by using these labels.

⑩ Residence Certificate

International students who currently reside in Japan are requested to submit this certificate, issued by the local government office, which states your status of residence (issued within 30 days) or a photocopy of your Residence Card.

⑪ Statement of Purpose

If applying to the Physics and Biology Departments, submit the statement of purpose using A4 size paper.

There is no set length or format for this note.

⑫TOEIC L&R TEST Taking Record Declaration Form or the equivalent thereof

(Department of Physics, Department of Chemistry, Department of Biology, Department of Planetology)

【 Those who took TOEIC L&R TEST in Japan 】

Please fill in the Confirmation Sheet of TOEIC L&R TEST Taking Record without missing.

Applicants use score submit service in the website of TOEIC L&R TEST, by using code "00010402" assigned Graduate School of Science, Kobe University. It is available from 17 days after you took the test, and you can choose one of scores if you took several tests during past two years from the date of entrance examination. Please note the due date for submit your score is August 16, 2023 and Official Score Certificate is not acceptable.

Score submit service in the website of TOEIC L&R TEST

https://ms.toeic.or.jp/Usr/Pages/Entry/Login.aspx

【 Those who took TOEIC L&R TEST out of Japan 】

Submit a copy of the Official Score Certificate of TOEIC L&R Test which was taken during past two years from date of entrance examination. The screenshot of display indicates your score on the internet is also acceptable.

A statement of reasons written on prescribed form is needed instead of the Official Score Certificate if it is difficult to submit at a time with other application documents. In either case be sure to bring your original Official Score Certificate on the day of entrance examination. It is allowed bringing Official Score Certificate newly if you get better score after application.

(2) Application Fee

(A) For applicants residing in Japan

Transfer from Japan Post Office

- Application fee payment of 30,000 yen (Japanese yen) can be transferred at post offices in Japan using a transfer application form provided by Kobe University.
- After making the payment, please submit part (A) of the form together with the application documents. (Make sure the transferred amount is correctly printed.)

(B) For applicants residing outside Japan

Application fee payment method

Please access the Application Fee Payment System of Kobe University from the URL shown below or the QR code, and pay with a credit card or Alipay.
The credit card holder does not have to be the applicant, but please be sure to enter the applicant's information in the Customer information field.
Please print the Incoming email of payment completion and attach it to the application form.

Student type	Faculty/Graduate	Amount of money	URL	QR code
Doctoral Program	Graduate School Of Science	¥30,660	https://tinyurl.com/y5gs7og8	

items
¥30,000 【Application fee】
¥660 【Remittance fee】

【Handling credit cards, etc. at the payment system of Kobe University】

*If an overseas applicant’ s payment is not completed by the deadline, the application will not be accepted. Once paid, the application fee cannot be refunded for any reason.

(3) Application Procedure by mail

The applicants must be sent by registered mail to arrive no later than 17:00 on each department's deadline date. At the same time, please send an e-mail indicating that your application documents have been sent by post. Upon receiving this e-mail, we will send you the “Identification Card for the Examination” and “Important Notice for Applicants” by e-mail.

(4) Contact for submission and inquiries

Kyomu-gakusei-kakari (Section of Student Affairs)
Graduate School of Science, Kobe University
1-1, Rokkodai-cho, Nada-ku, Kobe 657-8501
TEL: 078-803-5767

5. Screening Method

(1) Mathematics

Screening will be made after comprehensively examining an academic transcript from the school the applicant graduated from and the results of written and oral examinations. An examinee who is not able to visit Japan for an unavoidable reason on the examination day can take the oral examination using an internet phone service such as zoom, if it is permitted by the department.

Details of the date and time and the written and oral examinations include specialty subjects. Please refer to Appendix page 8.

(2) Physics, Chemistry

Screening will be made after comprehensively examining an academic transcript from the school the applicant graduated from and the results of written and oral examinations.

Details of the date and time and the written examination and oral examinations include specialty subjects as designated by each department. Please refer to Appendix - page 8-9.

(3) Biology

Screening will be made on the basis of the application documents and an oral examination using an internet phone service such as Skype. Details of the oral examination will be sent to the applicants individually by their intended professors. Oral examinations may be held at the examination room of the Graduate School of Science in person for those residing in Japan or who come to Japan.

Details of the oral examination and the examination room are specified in the Appendix page 9.

(4) Planetology

Screening will be made on the basis of the application documents, and an oral examination. Details of the oral examination will be sent to each applicant separately by their intended professor.

An examinee who is not able to visit Japan for an unavoidable reason on the examination day can take the oral examination using an internet phone service such as Skype, if this is permitted by the department being applied to. Details of the date and time and examination room are specified in the Appendix page 9.

6. Notification of the Result

Applicants will also be notified of the results (pass or fail) by mail. In addition, applicants can confirm their results through the official website of Graduate School of Science on Wednesday, September 6, 2023 at 10:00 Inquiries for the results by telephone are strictly prohibited.

7. Enrollment Procedure

(1) Admission Period・Enrollment Documents

Period of Enrollment Procedures：Middle of March, 2024.

Documents and forms required for university enrollment will be sent to every successful applicant together with an admission offer letter by early March, 2024.

(2) Admission Expenses

Payment Division		Amount	Details
Enrollment Fee		282,000 Yen	Must pay during the admission period.
Tuition	First Semester	267,900 Yen	Tuition payment for the first semester is withdrawn from the student's bank account on Wednesday, late April, 2024. If the tuition fee is revised during enrollment, the new fee will apply.
	Annual total (at present)	535,800 Yen	

(Note) The Fees mentioned above are an example for 2023.

This is not required for applicants who are Japanese Government Scholarship Students.

8. Important Notice

(1) Once you have submitted the documents, no changes to the contents are permitted, and the documents for your application will not be returned. The entrance examination fee is not refundable after application, except for the cases in which the application is not processed.

(2) The fees due prior to University entrance are not refundable.

(3) For the "Name of the Department" and "Name of research field" you wish to enroll in, make an entry in the appropriate column of the application form with reference to the introduction to the Graduate School of Science and this notice. Your intended supervisor's name should also be entered in parentheses.

(4) Applicants to the Department of Chemistry should contact the intended supervisor in advance of preparing an application.

(5) Application documents which are incomplete, or contain errors and omissions will not be accepted. Please confirm that the application form has no omissions nor errors.

(6) If any false statement is found in any of the application documents after admission, the admission may be cancelled. In cases in which an applicant does not fulfill entrance requirements, or has not graduated from university, earned a bachelor's degree, or completed school education, admission will be revoked.

(7) Applicants who will take the examination in Japan, please pay attention to the points below:

① Be sure to bring your Examination Admission Card with you on the day of examination.

② Applicants are not allowed to bring watches with functions other than the normal time display function,

such as translation functions or calculation functions.

③ Accommodation arrangements will not be made for the examination.

(8) Applicants with special needs who require special support in undergoing the examination process should consult the Graduate School of Science at least two weeks before the examination.

(9) Documents printed in languages other than English should be translated into English.

(10) To obtain the necessary forms, please send your request by e-mail to sci-kyomu@office.kobe-u.ac.jp.

9. [Information for applicants who successfully passed the entrance exam]

Control and Prevention of Infectious Diseases

Submission of a certificate demonstrating inoculation and an antibody test against measles and rubella:

Kobe University has implemented the *Measles and Rubella Registration Policy*, and all newly enrolled Kobe University students must submit one of the following three certificates (①, ②, or ③) to prevent a possible outbreak of measles and rubella on campus.

Please note that students admitted into the following schools should submit either ① or ③: School of Medicine (Faculty of Medicine and Faculty of Health Sciences), the Graduate School of Medicine, or the Graduate School of Health Sciences.

① A vaccination certificate to prove that you were inoculated against measles and rubella (twice each after one year of age).

② A vaccination certificate to prove that you were inoculated with measles and rubella vaccines each within the last five years (since April 2019).

③ An antibody certificate verifying that you have sufficient antibody titer in your blood (refer to the chart on the next page) to prevent the development of measles and rubella, based on the results of an antibody test performed within the last five years (since April 2019).

* For ① and ②, it can be a combined vaccine of measles and rubella vaccines (e.g., MR vaccine).
* For ① and ②, the certificate must be issued by an accredited medical institution, and state the type of vaccine and the date of inoculation.
* For ③, the certificate must specify the measuring method and the measured values of antibody titer in your blood (refer to the next page), and it must satisfy the judging standard listed in the chart. A blood test report sheet itself can be accepted for submission.

  If the antibody titer in your blood is insufficient, you must receive the necessary vaccination, and submit either ① or ②.
* You may submit a combination of ①, ②, and ③ (e.g., ① for measles, and ③ for rubella).
* If the antibody titer level is below requirements, yet you cannot be inoculated with vaccines for some reason (e.g., illness or body composition), please submit an official document (for example, a certificate issued by the doctor) explaining why.

<Submission Period and Place of Submission>

Submit the certificate when you register at the Medical Center for Student Health (Rokkodai) during your routine medical check-up scheduled for early April.

Measuring Methods and Judging Standards for Protective Antibodies in Blood

	Measuring Method	Judging Standard	Remarks
Measles	IgG－EIA method PA method NT method	8.0 ≦ positive 256x ≦ positive 4.0x ≦ positive	Positive result by one of these three methods.
Rubella	HI method IgG－EIA method	32x ≦ positive	Positive result by one of these two methods. (HI method is recommended)

Make sure the above methods are followed when the antibody titer is measured in your blood.

The protective antibody value differs according to the measuring method used. Please note that **the judging standards are higher than the usual standards used at medical institutions.**

Before you visit a medical institution, please make an appointment and confirm that the antibody test and/or the vaccine you need are available at that institution.

When you visit a doctor at a medical institution, make sure you present this guidebook so your doctor can issue the necessary certificate(s). (Please make sure you confirm with your doctor the measuring methods and judging standards when measuring the antibody titer in your blood.)

＊Points to Consider when Submitting a Certificate:

① Please submit the original certificate and one set of copies (A4 size).

② If the certificate is written in a language other than Japanese or English, please attach a document with either a Japanese or English translation.

For further information, please refer to:

Medical Center for Student Health, Kobe University Tel: 078-803-5245

Student Support Division, Student Affairs Department, Kobe University Tel: 078-803-5219

10. Others

(1) Financial support

Kobe University offers an admission fee waiver and a tuition waiver program.

Details will be informed separately.

(2) Privacy Statement

(1) With regard to personal data possessed by Kobe University, laws including the Law Concerning the Protection of Personal Information by Independent Administrative Institutions are observed, and every possible measure is taken to protect it based on the Personal Data Management Rules of Kobe University.

(2) Personal data provided to Kobe University for application are used for the selection of students, the announcement of accepted applicants, admission procedures, and research into selection methods of students.

(3) The personal data of accepted applicants provided to Kobe University for application is used after admission for student support (health management, scholarship application, etc.), educational purpose (student registration, academic guidance, etc.), and services related to tuition.

(4) With regard to the use of personal data for various services, some of the services may be entrusted by Kobe University to outside operators (hereinafter referred to as “entrusted operators”). In such cases, all or part of the personal data provided to Kobe University may be provided to the operators imposing the confidentiality of data, to the extent necessary to implement the entrusted services.

Appendix (Table)

1. Schedule for written examinations and oral examinations

Major	Written examination		Date, Time	
	Subject	Language		
Mathematics	Mathematics	English	August 23, 2023	9:30 – 12:00 Mathematics I 13:00 – 14:30 Mathematics II 15:00 – 16:00 English
			August 24, 2023	9:30 - Interview
Physics	Physics	Note (3)	August 22, 2023	9:30 – 11:30 Physics I 12:30 – 14:30 Physics II
			August 23, 2023	9:30 - Interview
Chemistry	Chemistry	Note (4)	August 22, 2023 Required arrival time 10:20	11:00 – 13:00 Chemistry
			August 23, 2023	13:00 - Interview
Biology		Note (3)	August 23, 2023	9:30 - Oral Examination
Planetology		Note (3)	August 23, 2023	9:00 - Oral Examination

In case of emergency, please check our website (http://www.sci.kobe- u.ac.jp/english/)
or our Twitter account (@kobeU_sci).

(Note) (1) A dictionary may not be used at the English examination.

(2) The examination of chemistry consists of basic questions (choose 2 out of 4 questions) and specialized questions (choose 1 subject out of 6). For specialized questions, you will be asked to select a subject field at the time of application. Please select one of the following six subjects and write "Selected Subject: ○○ Chemistry" in the margin of the name of the desired department on the application form. Please note that subject changes are not permitted after application procedures have been completed.

"Physical Chemistry", "Inorganic Chemistry", "Analytical Chemistry", "Organic Chemistry", "Quantum Chemistry", "Biochemistry"

A desk calculator will be lent to all the examinees in the examination for Chemistry.

(3) Department of Physics, Department of Biology, Department of Planetology

TOEIC L&R Official Score is used as an evaluation standard of English proficiency by weighted as listening: reading= 1:3.

(4) Department of Chemistry

TOEIC L&R Official Score is used as an evaluation standard of English proficiency by weighted as listening: reading= 1:2.

2. The place of writing and oral examinations

① Graduate School of Science, Kobe University

(1-1, Rokkodai-cho, Nada-ku, Kobe 657-8501)

*Access to Rokkodai Campus (Graduate School of Science)

From the nearest stations to Rokkodai Campus

Hanshin “Mikage” station, JR “Rokkomichi” station or Hankyu “Rokko” station

Take Kobe City Bus No.36 to “Shindai Bun/Ri/Nou Gakubu Mae” bus stop then walk for about three minutes south(downhill).

② Writing examination room and Oral examination room will be posted at the Y-building, 1st floor of the Graduate School of Science on the day of examination.

***Preliminary examination of eligibility 2.(4)-b) or (4)-c)**

1. Application Qualifications

Applicants must be recognized as having scholastic abilities equivalent or superior to a university graduate, as assessed through qualification screening of the Graduate School of Science, and must be 22 years of age or older at the day of March 31, 2024. (Applicants include those who have graduated from a junior college, as specialized vocational higher college, a school of the miscellaneous category or other educational institutions.)

2. Application Procedure

Applicants who intend to apply in accordance with above qualifications 2-(4)-a) or (4)-d), in Section 2 are required to apply in advance for the preliminary examination.

Please submit the following documents accordingly by Monday, June 12, 2023.

(Physics – by May 30, 2023 (Tue.), Planetology – by June 27, 2023 (Tue.) - by 17:00)

If you send your documents by mail, make sure that you write either “Application for Preliminary examination for English-Based on Master’s Program” with your major in red on the envelope and send it by registered mail to the Academic Affairs Section, Graduate School of Science, Kobe University.

Announcement of the result of the preliminary examination-- Applicants will be informed of the result of the evaluation by June 23 (Fri.), 2023.

(Physics – by June 7, 2023 (Wed.), Planetology – by July 4, 2023 (Tue.))

Please inform us once you have posted your application documents by sending a message to the following e-mail address: e-mail- sci-kyomu@office.kobe.u.ac.jp

(1) Documents to be submitted for preliminary examination

- Approval Request Form for Application (prescribed form)
- Application eligibility certification record (prescribed form)
- Research plan (prescribed form)
- Letter of Recommendation (prescribed form)
- Graduation/Completion Certificate/Academic Transcript for the university which you attend or have attended

(2) Approval Request Form

Please ask for this from the Academic Affairs Section of the Graduate School of Science via e-mail

"sci-kyomu@office.kobe-u.ac.jp"

3. Application Procedures

The applicants who receive notification of being eligible through preliminary examination should submit the documents stipulated in the application guidelines

Graduate School of Science, Kobe University

Department of Mathematics

I. Division of Analysis

This subject is aimed at the mathematical structures of changes occurring in phenomena. Included are the fields of functional equations, functional analysis, complex analysis, harmonic analysis, algebraic analysis and differential equations.

(1) Functional Equations

Mathematical analysis of nonlinear partial differential equations; methods of functional and harmonic analysis. (Y. Ohta, M. Higaki)

(2) Functional Analysis

Fourier analysis; Functional analytic methods for partial differential equations. (H. Takaoka)

(3) Complex Analysis

Complex analytic functions and special functions, such as elliptic functions and solutions of differential equations; Riemann surfaces; use of analytic and algebraic and geometric methods. (Y. Yamada)

II. Division of Algebra and Geometry

This subject is aimed at elucidating the essential properties behind the continuity and symmetry in structures related to equations and spaces. Included are the fields of number theory, automorphic forms, algebraic geometry, differential geometry and topology.

(1) Algebra

Structure and theory of algebraic manifolds, moduli theory, automorphic forms, automorphic representations, number theory. (K. Yoshioka, T. Taniguchi, K. Morimoto, T. Sano)

(2) Geometry

Differential geometry and topology; differentiable manifolds; theory of knots and links; minimal and constant mean curvature surfaces; singularities on Riemannian manifolds; hyperbolic space and low dimensional topology. (W. Rossman, S. Satoh, K. Saji, K. Wada)

III. Division of Applied Mathematics

This subject is aimed at the fields of probability, combinatorics, automorphic forms, number theory, computational mathematics, information science and mathematical physics, with applications to such things as science, engineering, computer science and economics in mind.

(1) Probability

Applications of probability theory to random motions, fluctuations and random phenomena of mathematical objects. (K. Fukuyama)

(2) Computational Mathematics

Computational methods in the mathematical sciences; efficient implementation on computers and development of computer algebra systems; applications to algebra, algebraic analysis and mathematical physics. (N. Takayama**, S. Aoki, T,Yaguchi)

Those staff members indicated by ** are scheduled to retire at the end of March 2025

Department of Physics

I. Division of Theoretical Physics

The aim of this division is to study theoretically on elementary particles, the most fundamental constituents of the universe, and various physical properties of condensed matter systems.

(1) Elementary Particle Theory

The properties of elementary particles and physics beyond the standard model are studied theoretically. The main interests of our research include higher dimensional theories, functional renormalization group, and supersymmetric theories. (H. Sonoda*)

(2) Cosmology

The origin of the spacetime and matter in the universe is investigated. The evolution of the large scale structure of the universe is also studied. (J. Soda)

(3) Condensed Matter Theory

Mechanisms of superconductivity and magnetism in various systems are studied using analytical and numerical methods with emphasis on the view point of spontaneous symmetry breaking and quantum information. (K. Kuboki, T. Nishino)

(4) Quantum Solid State Physics

Electronic properties of solid states are theoretically investigated to understand the macroscopic quantum phenomena in strongly correlated electron systems such as heavy electron systems. (H. Harima*)

II. Division of Particle Physics

The aim of this division is to experimentally study the properties of elementary particles and the interactions between them, and to answer questions about the early universe.

(1) Particle Physics

We work on experiments, using the most advanced experimental facilities, such ashigh-energy hadron collider experiment (LHC-ATLAS), neutrino experiments(Super-Kamiokande, Hyper- Kamiokande, T2K) and dark-matter searches (XENON, NEWAGE).
(H. Kurashige, Y. Takeuchi, Y. Yamazaki, A. Ochi, K. Miuchi, J. Maeda. A. Suzuki.)

III. Division of Condensed Matter Physics

The aim of this division is to experimentally study on the magnetic, electric, and thermal properties of condensed matter systems such as magnetic material, superconductor, and semiconductor.

(1) Extreme Condition Condensed Matter Physics

Quantum phenomena are studied by electron spin resonance and nano-scale magnetometry under extreme conditions, such as low temperature, high magnetic field, and high pressure.
(H. Ohta*, E. Ohmichi, S. Okubo)

(2) Low Temperature Condensed Matter Physics

Quantum phenomena, such as superconductivity, magnetism, and multipole order, are studied by nuclear magnetic resonance and macroscopic measurements under complex conditions such as low-temperature, high-magnetic field and high pressure.
(H. Tou, H. Kotegawa)

(3) Quantum Dynamics

Spectroscopic studies on the dynamical and microscopic responses of electrons, atoms and molecules in condensed matter by means of ultrashort laser pulses, and highly charged ions. (Currently, there are no faculty members, so you cannot select this field as your desired field.)

(4) Correlated Electron Physics

Our study is focused on the crystal growth and low temperature measurements in highly correlated electron systems to explore new quantum phenomena, such as unconventional superconductivity and magnetism. (H. Sugawara, E. Matsuoka)

Those staff members indicated by ** are scheduled to retire at the end of March 2024.

Department of Chemistry

I. Division of Physical Chemistry

Research and education are directed toward understanding structures and dynamics of molecules, clusters, and solid surfaces using various laser spectroscopic and quantum chemical methods. The structures are investigated by high-resolution spectroscopy, resonant enhanced multi-photon spectroscopy, and scanning micro probe. The excited states and reaction dynamics are studied by time-resolved nonlinear spectroscopy, scanning micro probe, and pulse shaping method. Physicochemical understanding of chemical reaction mechanism is leaned through the experimental studies.

(1) Molecular Structure and Dynamics

Research and education are aimed to understand molecular structure and control dynamics and chemical reaction on the basis of laser spectroscopy and quantum theory.
(A. Wada, S. Kasahara)

(2) Material Physical Chemistry

Chemistry at buried interfaces is studied with advanced scanning probe microscopy and optical spectroscopy. Brand-new methods for characterizing nanometer-sized materials are being developed. New solid compounds are synthesized. (H. Onishi, K. Kimura, K. Eda**)

(3) Chemical Reaction Dynamics

Research and education focus on structure and electronic interaction of intermediate species in photoactive proteins and in solar cells by using time resolved electron paramagnetic resonance spectroscopy. Our main scope is elucidations of molecular function for novel light-energy conversion processes. (Y. Kobori, T. Tachikawa)

II. Division of Inorganic Chemistry

Research and education focus on coordination chemistry, inorganic materials chemistry, analytical chemistry, electrochemistry, and reaction chemistry: development of functional materials including organometallic compounds, metal oxides, and polyoxometalate compounds, and analysis of electrochemical reactions, electron transfer reactions, and chemical dynamics in condensed matter.

(1) Solid State Chemistry

Research and education focus on synthesis and characterization of functional inorganic materials including coordination compounds and metal oxides in crystalline or non-crystalline forms. (T. Mochida, T. Uchino, K. Takahashi)

(2) Solution Chemistry

Research and education focus on the charge (ion and electron) transfer reactions at electrode/solution and oil/water interfaces and their application to the electrochemical analysis of biologically relevant compounds. (Currently, there are no faculty members, so you cannot select this field as your desired field.)

(3) Physical Inorganic Chemistry

Chemical dynamics is studied in condensed matter such as liquids and proteins including their interaction, reaction, and relaxation. (K. Tominaga, S. Akimoto)

III. Division Organic Chemistry

Fundamental researches on organic chemistry and biochemistry, in particular, investigations of new synthetic methodologies and molecular design based on supramolecular chemistry and protein science are executed.

(1) Organic Reaction Chemistry

Research and education are conducted on development of new methodologies for selective organic synthesis, investigation of general and highly efficient catalytic routes yielding useful compounds for life science and material science. (M. Hayashi, R. Matsubara)

(2) Organic Molecular Structure and Function

Research and education focus on molecular structure and functions based on organic chemistry and material science; design, synthesis, and structural analysis of supramolecular architectures composed of p-conjugated macrocycles and cage compounds. (A. Tsuda)

(3) Biomolecular Science

Research and education focusing on folding and structural formation of proteins and enzymes, their dynamical functions in solutions and in biomembranes, and conversion of their functions by biotechnological methods. (A. Tamura, E. Chatani, T. Kimura)

IV. Visiting Academic Staff for Cooperative Division (Japan Synchrotron Radiation Research Institute)

(1) Materials Structure Science

Research and education are conducted with a focus on the structural analysis of crystalline materials with synchrotron radiation, dynamic structural analysis, and the use of diffraction techniques and biological macromolecules using X-ray scattering techniques and fluid structure analysis. (T. Koganezawa, K. Uesugi, O. Sekizawa)

Ⅴ. Visiting Academic Staff for Cooperative Division (Institute of Physical and Chemical Research)

(1) Theoretical Biochemistry

We aim to understand chemical reactions, properties, and functions of large molecular systems such as biomolecules and biodegradable polymers by quantum chemical calculations using supercomputers. (T. Nakajima)

Those staff members indicated by ** are scheduled to retire at the end of March 2024.

Department of Biology

I. Division of Biomolecular Organization

This division conducts education and research on the cell structure and functions in levels of molecules, cells, tissues, and individuals.

(1) Molecular Physiology

Animals receive various external signals as stimuli through their sensory organs. The sensory information is integrated and processed in the brain to express adaptive behavior according to the circumstance. Our education and research focus on functioning of molecular mechanisms within cells at various levels, such as intercellular communication and interactions between individuals, to understand the mechanisms underlying the expression of adaptive behavior. (H. Aonuma, M. Sakura)

(2) Cell Function

Plants do not have to move from where they live by conducting photosynthesis. Instead, they have abilities to change their cell function, organ growth, and developmental program in response to environmental changes. We educate and research on the mechanisms and their evolution of various plant physiological/morphological responses to environment based on the molecular and cell biology. (H. Fukaki, K. Ishizaki, Y. Kondo)

(3) Bioinformation

Aiming to explore information processing in biological systems, our education and research focus on signal transductions underlying "brain function" and "membrane traffic and cellular morphology in model organisms". (M. Miyamoto, M. Morita, H. Tsukamoto, J. Kashiwazaki)

II. Division of Biosignal Transduction

This division conducts education and research on the mechanisms of gene expression and the regulation of biological responses through the intracellular signal transduction.

(1) Gene Expression

We educate and research on the mechanisms of gene expression and the related developmental processes; germ cell determination and differentiation in the nematode C. elegans and zebrafish, microRNA function, and regulation of RNA splicing in vertebrates and *C. elegans*, as well as gene regulatory mechanism of cell fate specification in cardiac neural crest. (H. Sakamoto*, K. Inoue, S. Matsuhana)

(2) Genetic Information

We educate and research on the molecular mechanisms underlying maintenance and diversification of genetic information, and also on the intracellular signal transduction pathways by the post-translational modifications of proteins that regulate biological responses to genotoxic stresses caused by various endogenous as well as environmental agents. (K. Sugasawa, M. Yokoi, W. Sakai)

(3) Gene Function

We educate and research on the functions of genes involved in the regulation of cellular transformation, apoptosis, and senescence, and also in the processes of morphogenesis. Studies are focused on the molecular mechanisms of cell fate decision between apoptosis and senescence induced by cellular stresses, and the functions of long noncoding RNA and small peptide genes in *Drosophila* development. (S. Kamada**, Y. Kageyama, T. Iwasaki)

III. Division of Biodiversity

This division conducts research and educational program on ecology and systematic biology for elucidating origin and sustenance mechanism of biodiversity of various biota inhabiting

both terrestrial and marine environments.

(1) Ecology and speciation
This course covers studies on ecological aspects of biodiversity and its conservation, with particular interests in revealing mechanisms of species interactions, evolutionary change, speciation and diversity of aquatic plants and animals. (N. Okuda, K. Suetsugu, K. Tsuji)

(2) Evolution and phylogeny
We focus on the researches and education of the evolutionary aspects of biodiversity, systematics, metabolic physiology, cell structures and ecology of diverse algae, and apply the results for the conservation and improvement of the aquatic ecosystems. (S. Uwai, H. Sakayama, R. Onuma)

IV. Division of Developmental Biology

This program provides basic knowledge on developmental biology, covering developmental genetics on vertebrate and invertebrate model organisms and deep evolutionary history of animal forms. We also provide research opportunities using cutting edge technologies in bioimaging, cell biology, anatomy and gene expression.

(1) Developmental Biology****
Research and education in this division cover fundamental problems in developmental biology, including organ morphogenesis in *Drosophila,* respiratory/circulatory system development in mouse, and evolutional morphology in vertebrates. (S. Hayashi, S. Kuratani, M. Morimoto, W. Kimura)

V. Division of Bioregulatory Science

This division reviews the discovery research for bioactive compounds and the study of their mode of action, translocation and metabolism in organisms such as insects, fungi and plants.

(1) Bioregulatory Science****
Research and education in this division are conducted to clarify the interaction between the organisms and bioactive compounds integrating a variety of technologies. (S. Kawamura, S. Yamato, F. Iwahashi)

Those staff members indicated by * are scheduled to retire at the end of March 2024.
Those staff members indicated by ** are scheduled to retire at the end of March 2025.
For retirement schedule of the staff members in the research fields indicated by ****, please directly contact each staff member.
If you wish to apply for the research fields indicated by ****, you need permission from the staff members in advance.

Department of Planetology

Why is this planet to be the Earth? In order to answer this fundamental question, we are aiming at comprehensive understanding of the evolution of the earth, planetary and solar systems by analyzing various processes occurring at spaces from the center of the Earth to the edge of the solar system with multidisciplinary approaches.

I. Division of Fundamental Planetology

This division aims at cultivating discerning persons leading society and /or academic communities by logical analyses and considerations of variable phenomena in planetary and Earth systems.

(1) Geology

We examine surficial materials and geologic structures of the Earth. Our main targets include the various geologic phenomena associated with plate subduction characterizing "planet Earth", environments and life evolution, and tectonics. (Y. Yamamoto, K. Yamasaki)

(2) Petrology and Mineralogy

We examine various kinds of Earth and planetary materials to elucidate their origin and evolution by using various methods such as electron microscopy, chemical analyses, synchrotron radiation, experimental reproductions, field works, and so on. (K. Kaneko, K. Kiyosugi, R. Nakaoka)

(3) Solid Geophysics

We study source processes of large earthquakes and slow earthquakes, seismic wave propagation, tsunami generation and propagation processes, and dynamics associated with subduction of oceanic plates such as slab deformation, temperature and flow fields. (S. Yoshioka, Y. Kakehi)

(4) Fluid Geophysics

We investigate, by the use of theoretical and numerical methods, the structures and the evolutions of fluid spheres, mainly the atmospheres, of the planets in our solar and exosolar systems in general, and we are trying to argue the problem by understanding Earth's fluid sphere as one of the realization of those general features.
(Y. Hayashi*, Y. Takahashi, H. Kashimura)

(5) Planetary Astrophysics

The major goal of our group is to advance our understanding of the origin and evolution of ring-satellite systems, small solar system bodies, and planetary systems including those outside our solar system, mainly by theoretical research and analysis of data obtained by telescopes and spacecraft observations. (K. Ohtsuki, A. M. Nakamura, N. Hirata)

II. Division of Frontier Planetology

This division aims at cultivating aspirational persons pioneering frontier researches in planetology in collaboration with national institutes of planetary and earth sciences.

(1) Experimental Planetary Science

We study the origin and evolution of planetary bodies by means of laboratory experiments and planetary explorations. Our research interests are the effects of planetary collisions on the variety of solar system bodies and the tectonics of icy satellites and cometary nuclei.
(M. Arakawa, M. Yasui)

(2) Marine Geodynamics

We conduct researches on the structure and evolution of the solid Earth using marine geophysical methods. (N. Seama, H. Sugioka, H. Hirose, T. Minami)

(3) Computational Planetology

We mainly study the formation and evolution of astronomical objects from the large scale structure of the universe for planets by means of theoretical and computational approaches. We also works on the research and development of numerical algorithms, software, and hardware (J. Makino, T. Saitoh).

III. Cooperative Division

(1) Evolutionary History of the Planets and the Earth****

We carry out observational studies on cosmology and galaxy formation (NAOJ), and study the history of the Japanese Islands related to global evolution of the Earth (JAMSTEC). (M. Obayashi, S. Miyazaki, T. Nozaki)

(2) Applied Planetology****

Japan has experienced natural disaster conditions brought by torrential rain, typhoons, and so on. The global warming is also an urgent issue. Thus, meteorology is an increasingly important branch of the planetary science. By making use of various facilities of the Meteorological Research Institute, we study the atmosphere close to the earth's surface and the data assimilation and predictions of local heavy rainfalls (T. Kawabata, S. Yoshida).

Those staff members indicated by * are scheduled to retire at the end of March 2024.
If you wish to apply for the research fields indicated by ****, please consult with the head of the department (see the website of the Department of Planetology) before submitting the application for admission.