

# Guidelines for Application 2027

## English-Based Master's Program

Mathematics

Physics

Chemistry

Biology

Planetology

### \* Important

1. This graduate school has introduced online applications, and it is necessary to register your application online before submitting application documents. For the web application, you will need equipment such as a computer and printer, an email address, and a photograph data. Please make sure to fully check payment methods for the examination fee, submission methods for documents, etc., and apply with plenty of time. In addition, important information regarding the entrance examination will be sent from the university to the email address registered during the web application process, so please register an email address that you check regularly.

2. If you wish to apply, please be sure to contact your preferred faculty advisor before submitting your application.

3. The Graduate School of Science provides information regarding the entrance examination on the "Admission" page of our website (<https://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 X account (@kobeU\_sci) for updates.

Graduate School of Science, Kobe University

## 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, 2027, awarded in a foreign country.
  - b) Those who have completed 15 years of school education or will complete it by March 31, 2027, 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, 2027.

(Note 1) Applicants who intend to apply in accordance with qualifications (4)-b) or c) must refer to “\* Preliminary examination of eligibility ((4)-b) or (4)-c)”

Furthermore, those who meet the qualifications in (4)-c) are graduates of junior colleges, technical colleges, vocational schools, miscellaneous schools, and completers of other educational institutions.

(Note 2) If you have any questions regarding eligibility for application, please contact the Academic Affairs and Student Section of the Graduate School of Science, Kobe University.

e-mail: [sci-kyomu@office.kobe-u.ac.jp](mailto: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 and Application Method

Both procedures ① and ② below are required. Please be careful to ensure there are no deficiencies.

① Registration of application and payment of admission examination fee on the web application site

**Web Application Site (<https://e-apply.jp/ds/kobe-u/>)**

Department	Web Application Registration Period / Examination Fee Payment Period
Physics	From May 23, 2026 to June 12, 2026
Mathematics Chemistry Biology	From June 13, 2026 to July 2, 2026
Planetology	From July 5, 2026 to July 24, 2026

Refer to the list of entrance and advancement examination dates

Please register your application and pay the admission examination fee by referring to the attached document "Flow of Web Application" before submitting your application documents. When registering your application information, complete the procedures marked as [Web] in the list of application documents on the web application site.

If you encounter any issues with communication to the web application site, please contact the inquiry address below.

② Submission of Application Documents

For the documents listed as [Paper] in the following list of application documents, please submit them either in person or by mail.

Department	Application Period
Physics	From June 9, 2026 to June 12, 2026
Mathematics Chemistry Biology	From June 29, 2026 to July 2, 2026
Planetology	From July 21, 2026 to July 24, 2026

After registering your application on the web application site and completing the payment of the entrance examination fee, please submit the documents marked as [Document] in the list of application documents.

\* We will contact you separately via email regarding how to submit your application materials.

### 4. Documents Required for the Application Procedure

(1) Please gather and submit the documents listed in the application document checklist.

- [Web]: Please follow the instructions on the web application site and complete the procedure.
- [Document]: Submit either in person at the office or by mail.
- Documents marked with ◆ will be sent electronically, so please send a request by email to the Section of Academic Affairs of the Graduate School of Science. At that time, please use the subject line as "Request for Application Documents for English-Based Master's Program".

e-mail: [sci-kyomu@office.kobe-u.ac.jp](mailto:sci-kyomu@office.kobe-u.ac.jp)

\* Please note that we will contact you separately via email regarding how to submit your application documents.

Application document checklist	Summary
① Application for Admission/Resume [Document]	Enter the information on the web application site and print it out. * When creating, please carefully check (2) Precautions.
② Face photo data [Web]	Please follow the instructions on the web application site and upload your photo. (Upper body without a hat, facing forward, no background, clearly taken alone within 3 months before the application, in jpg, jpeg, png, bmp, or heic format, and the file size must not exceed 2 MB.) Please note that the facial photo data will be used on the examination admission ticket and for identity verification during the examination. If the facial photo data has been altered or retouched, making it impossible to confirm it is the same person, you may not be allowed to continue with the examination.
③ Examination Fee (30,000 yen) [Web]	<Payment Method> Please make the payment procedure through the web application site. Note that any fees associated with the payment shall be borne by the payer.
④ Academic Transcript [Document]	Documents created by the dean of your alma mater or the principal of your former school. * Those applying under eligibility (4)-c are not required to submit this document. * International students who are currently enrolled as research students, etc., in this graduate school (or faculty) and are continuing to apply are not required to submit them. * Applicants whose last school attended is a university in China must, in addition to these documents, submit the following documents. All of these documents require authentication through the China Higher Education Student Information and Career Center (CHSI). Register on the CHSI website ( <a href="https://www.chsi.com.cn/xlcx/bgys.jsp">https://www.chsi.com.cn/xlcx/bgys.jsp</a> ), obtain the relevant documents in PDF format, and print them on A4 paper. At the time of submission, the web authentication must have more than one month remaining before expiration. If the web authentication cannot be performed by the graduate school due to reasons such as the web authentication being expired, the application documents will be considered incomplete. <For those who have graduated (completed)> • Online Verification Report of Higher Education Qualification Certificate (in English) • Online Verification Report of Higher Education Degree Certificate (in

	<p>English)</p> <p>&lt;For those currently enrolled in a university or graduate school and expected to graduate (complete)&gt;</p> <p><u>At the time of application</u></p> <ul style="list-style-type: none"> <li>• Online Verification Report of Student Record (in English) At the time of <u>enrollment</u></li> <li>• Online Verification Report of Higher Education Qualification Certificate (in English)</li> <li>• Online Verification Report of Education Degree Certificate (in English)</li> </ul>
⑤ Graduate/Completion (expected) Certification [Document]	<p>Documents created by the dean of your alma mater or the principal of your former school.</p> <p>* Those applying under eligibility (4)-c are not required to submit this document.</p> <p>* Applicants whose last school attended is a university in China should submit a certificate from the China Higher Education Student Information and Career Center (CHSI), similar to the completion (anticipated) certificate, under item ④.</p>
⑥ Government-Funded International Student Certificate [Document]	<p>Those who are Japanese Government (MEXT) scholarship students at the time of application should submit a certificate issued by their current university indicating that they are Japanese Government (MEXT) scholarship students.</p> <p>* If a Japanese Government (MEXT) scholarship student who is enrolled as a research student, etc., in this graduate school (undergraduate) continues to apply, submission is not required.</p>
⑦ Recommendation Letter 1 [Document]	<p>Letter of recommendation from the dean of the faculty you are currently attending or have graduated from.</p> <p>* In addition, international students who are currently enrolled as research students, etc., in this graduate school (or faculty) and are continuing to apply are not required to submit them.</p>
⑧ Recommendation Letter 2 [Document]	<p>Letter of recommendation from the academic advisor of the university you are currently attending or have graduated from</p> <p>* In addition, international students who are currently enrolled as research students, etc., in this graduate school (or faculty) and are continuing to apply are not required to submit them.</p>
⑨ Recommendation Letter 3 [Document]	<p>Letter of recommendation from your direct supervisor if you are employed by a public institution or a company at the time of application.</p>
⑩ Residence Certificate [Document]	<p>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.</p>

<p>⑪ Statement of Purpose [Document]</p>	<p>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.</p>
<p>⑫ Confirmation Sheet of TOEIC L&amp;R TEST Taking Record ◆ [Document]</p>	<p>* To be submitted only by applicants for Department of Physics, Chemistry, Biology, Planetology * Scores from the TOEIC Institutional Program (IP) are not accepted.</p> <p><u>Scores from the TOEIC Listening &amp; Reading public test taken within the past 2 years from the date of entrance examination are considered valid.</u> In addition, <u>multiple submissions of scores are not allowed.</u></p> <p><b>【Those who took TOEIC L&amp;R TEST <u>in Japan</u>】</b> Please fill in the required information on the Confirmation Sheet of TOEIC L&amp;R TEST Taking Record (the form prescribed by this graduate school) and submit it. Also please submit your scores via the following website by August 3, 2026.</p> <p>&lt;Score submit service in the website of TOEIC L&amp;R TEST&gt; (<a href="https://ms.toEIC.or.jp/Usr/Pages/Entry/Login.aspx">https://ms.toEIC.or.jp/Usr/Pages/Entry/Login.aspx</a>) &lt;Application Code: Graduate School of Science, Kobe University&gt; 00010402</p> <p>* It is available from 17 days after you submit your scores. Official Score Certificate is not acceptable.</p> <p><b>【Those who took TOEIC L&amp;R TEST <u>out of Japan</u>】</b> Please fill in the required information on the Confirmation Sheet of TOEIC L&amp;R TEST Taking Record (the form prescribed by this graduate school) and submit it. Please note that, unlike those who took the exam in Japan, those who took the exam overseas are not eligible to use the system described above; therefore, please submit the original “Official Certificate” for the TOEIC L&amp;R test you took within the two years prior to the date of entrance examination. If you are unable to submit the required documents during the application period, please submit the original TOEIC L&amp;R “Official Certificate” by August 3, 2026.</p>

## (2) Important Notice

### <Important Notes by Department>

Department	Important Notes
Mathematics	• Before applying, you must contact your preferred supervisor to confirm that the laboratory can accept you.
Physics	• Before applying, you must contact your preferred supervisor to confirm that the laboratory can accept you.
Chemistry	• Before applying, you must contact your preferred supervisor to confirm that the laboratory can accept you. • Please select your elective subjects while paying attention to Appendix (Table) 1. Schedule for written examinations and oral examinations ' (Note) (3) '.
Biology	• Before applying, you must contact your preferred supervisor to confirm that the laboratory can accept you.
Planetology	• Before applying, you must contact both of your first-choice and second-choice supervisors to confirm that the laboratory can accept you.

### <Other Important Notes>

- To obtain the necessary forms, please send your request by e-mail to [sci-kyomu@office.kobe-u.ac.jp](mailto:sci-kyomu@office.kobe-u.ac.jp).  
\* We will contact you separately via email regarding how to submit your application materials.
- The "Receipt No." is not the exam number.
- If the payment procedures for the examination fee, etc., are not completed by the payment deadline after completing the web application registration, the application will not be accepted.
- 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.
- Application documents which are incomplete, or contain errors and omissions will not be accepted.  
Please confirm that the application form has no omissions or errors.
- 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.
- Documents printed in languages other than English should be translated into English.
- There is a system that exempts applicants affected by large-scale disasters from paying the examination fee.  
(<https://www.office.kobe-u.ac.jp/stdnt-examinavi/juken/menjoyotou/index.html>)

## (3) 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

e-mail : [sci-kyomu@office.kobe-u.ac.jp](mailto:sci-kyomu@office.kobe-u.ac.jp)

## 5. Examination admission ticket

Please download your examination admission ticket from the My Page section of the web application site.

Once it becomes available for download, a notification email will be sent to the email address registered on the web application site.

Please print the downloaded admission ticket in color and bring it with you on the day of the exam.

If you do not receive the email by July 16, 2026 (for the Planetology program, August 7, 2026), please contact the Academic Affairs and Student Services Section of the Graduate School of Science.

## 6. 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.

### (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.

### (3) Biology

Screening will be made on the basis of the application documents and an oral examination using an internet phone service such as Zoom. 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.

### (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 Zoom, if this is permitted by the department being applied to. Details of the date and time and examination room are specified in the Appendix.

## 7. 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 September 9, 2026 at 10:00 JST. Inquiries for the results by telephone are strictly prohibited.

## 8. Enrollment Procedure

### (1) Admission Period · Enrollment Documents

Period of Enrollment Procedures: Middle of March 2027.

Documents and forms required for university enrollment will be sent to every successful applicant together with an admission offer letter by Mid-February 2027.

### (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 late April 2027. 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 2026.

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

## 9. Examination Instructions

(1) 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.

(2) Applicants with special needs who require special support in undergoing the examination process should consult the Graduate School of Science at least 2 weeks before the examination.

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

### Preventive measures 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.

- ① A vaccination certificate to prove that you have received two doses each of the measles and rubella vaccine after turning one year old (recommended)
- ② A vaccination certificate to prove that you were inoculated with measles and rubella vaccines each within the last five years (since April 2022).
- ③ An antibody certificate to prove that you have sufficient antibody titer in your blood (refer to the chart 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 2022)

\* For ① and ②, a combined vaccine against measles and rubella (e.g., MR vaccine) is permissible.

\* 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.

- \* If you have a history of measles or rubella, please submit ③ or receive a vaccination and submit ① or ②.
- \* 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 your antibody titer level is below the threshold, yet you are unable to receive the vaccinations due to certain circumstances (such as illness or specific body conditions), please provide an official document (like a medical certificate) that explains the reason.

Procedure, deadline, and location for submission

All successful undergraduate and graduate applicants enrolling in April (except the Graduate School of Medicine, the Graduate School of Health Sciences and the Graduate School of Maritime Sciences):

Please submit at the time of the medical checkup for new students scheduled in April.

**Measuring methods and judging standards for blood antibody titers**

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

- \* Antibody testing is not required if the vaccination history meets the requirements or if additional vaccinations are given.
- \* 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 visiting a medical institution, please confirm in advance whether you can receive the necessary antibody tests and/or the vaccinations.
- \* When you visit a doctor at a medical institution, make sure to present this document to obtain the necessary certificate(s). (In particular, when taking an antibody test, please ensure the measurement methods meet the above criteria.)
- \* Points to consider when submitting a certificate:
  - ① Please bring the original certificate along with one copy (A4 size).
  - ② If the certificate is written in a language other than Japanese or English, please attach a document showing the Japanese or English translation.

For further information, please refer to:

Healthcare Center, Kobe University      Tel: 078-803-5245

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

## 11. 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 (Law No. 57 of 2003), 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, survey/research into selection methods of students and improvement of graduate school education. The survey/research and publication of the results will be handled in such a way that individuals cannot be identified.
- ③ The personal data of accepted applicants provided to Kobe University for application is used after admission for student support (health management, tuition exemption, scholarship application.), 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, personal data will be provided to entrusted operators to the extent necessary to perform the work, but entrusted operators will be instructed to observe confidentiality obligations.

## Appendix (Table)

### 1. Schedule for written examinations and oral examinations

Major	Written examination		Date, Time (JST)	
	Subject	Language	Note ①	
Mathematics	Mathematics	English Note ②	August 19, 2026	9:30 – 12:00 Mathematics I 13:00 – 14:30 Mathematics II 15:00 – 15:30 English
			August 20, 2026	9:30 - Interview
Physics	Physics	Note ④	August 18, 2026	9:30 – 11:30 Physics I 13:00 – 15:00 Physics II
			August 19, 2026	9:30 - Interview
Chemistry	Chemistry Note ③	Note ⑤	August 24, 2026 Required arrival time 10:20	11:00 – 13:00 Chemistry
			August 25, 2026	13:00 - Interview Note ⑥
Biology		Note ④	August 26, 2026	9:30 - Oral Examination
Planetology		Note ④	August 26, 2026	9:00 - Oral Examination

(Note) ① In case of emergency, please check our website (<https://www.sci.kobe-u.ac.jp/en/>) or our X account (@kobeU\_sci).

② A dictionary may not be used at the English examination.

③ The examination of chemistry consists of basic 4 questions and specialized questions (choose 1 subject out of 4). For specialized questions, you are required to select a subject field at the time of application. Select one of the following four subjects during the online application process. Note that subject changes are not permitted after application procedures have been completed.

【"Physical Chemistry", "Inorganic Chemistry", "Organic Chemistry", "Biochemistry"】

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

④ 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.

⑤ Department of Chemistry

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

⑥ The interview consists of the oral examination about basic chemistry and an oral presentation of up to 3 minutes on the content of your graduation research or your research plans after enrollment, followed by a Q&A session.

### 2. The place of written 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 BunRiNou Gakubu Mae” bus stop then walk for about three minutes south (downhill).

- ② Written 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, 2027. (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 June 5, 2026. (Physics – by May 29, 2026)

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 17, 2026. (Physics – by June 5, 2026 )

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](mailto: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](mailto: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\*, A. Honda, M. Higaki)

#### (2) Functional Analysis

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

#### (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. (Note: This field is currently unavailable for selection due to having no faculty members in this field.)

### 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\*\*, T. Murayama)

#### (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. Shutoh, H. Fuji, Y. Iwamasa)

Those staff members indicated by \* are scheduled to retire at the end of March 2027.

Those staff members indicated by \*\* are scheduled to retire at the end of March 2028.

## 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 Physics and Cosmology

The properties of elementary particles and physics beyond the standard model and quantum gravity are studied theoretically. The origin of the spacetime and matter in the universe is investigated. (J. Soda\*\*\*, R. Jinno, A. Ito)

#### (2) 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. (T. Nishino)

#### (3) Quantum Solid State Physics

A theoretical study that explores diverse physical properties of matter, such as quantum transport, superconductivity, and nonequilibrium phenomena, based on quantum theory, aiming to transcend the conventional boundaries of physics and pioneer a new frontier in materials science. (Y. Fuseya)

### 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 as high-energy hadron collider experiment (LHC-ATLAS), neutrino experiments (Super-Kamiokande, Hyper-Kamiokande, T2K) and dark-matter searches (XENON, NEWAGE). (Y. Takeuchi, Y. Yamazaki, K. Miuchi, J. Maeda, A. Suzuki\*\*, H. Ito)

### 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. (E. Ohmichi, S. Okubo, M. Akaki)

#### (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, R. Hibino)

#### (3) 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)

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Those staff members indicated by \*\*\*are scheduled to retire at the end of March 2029.

## 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 learned 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)

#### (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

Development of novel spectroscopic methods using ultrashort pulsed lasers and their application to the study of intermolecular interactions and dynamical structure and reaction dynamics in condensed phases (molecular crystals, solutions/liquids, polymers, etc.).

(K. Tominaga\*\*)

#### (3) Physical Inorganic Chemistry

Excitation dynamics of biomolecules, including their relaxation, energy transfer, and electron transfer, are studied in solutions and in photosynthetic pigment-protein complexes. (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. (R. Matsubara, H. Mitsunuma)

(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. (E. Chatani, A. Tamura<sup>\*\*\*</sup>, 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)

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## 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, A. Takeishi)

#### (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. Aihara)

#### (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 formation and pigment cell differentiation in zebrafish, gene regulatory mechanism of cell fate specification in cardiac neural crest of chicken embryo, and the regulatory mechanisms of gene expression and their evolutionary dynamics in tissue regeneration using amphibians and zebrafish. (K. Inoue, H. Ochi, 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. Sugawara\*, 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. (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 mammalian developmental biology, tissue regeneration and active hypometabolism such as hibernation.

(1) Developmental Biology

Research and education in this division cover fundamental problems in developmental biology and tissue regeneration in respiratory/circulatory system in mouse, and active hypometabolism such as hibernation. We also provide research opportunities using cutting edge technologies in bioimaging, stem cell biology, gene expression and organ regeneration. (M. Morimoto, W. Kimura, G. Sunagawa, K. Miyamichi)

#### **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.

(F. Iwahashi)

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Please contact your prospective supervisor and obtain approval before submitting your application for admission.

## 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 the structures and the evolutions of atmospheres and surface environments of the planets in our solar and exosolar systems, mainly by theoretical and numerical methods. (G. L. Hashimoto, 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\*\*, 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) Marine Geodynamics

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

#### (2) 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 work on the research and development of numerical algorithms, software, and hardware (J. Makino\*\*, T. R. Saitoh).

#### (3) Primitive Body Science

We conduct experimental research on the physical properties, impact processes, and dynamics of small bodies, meteorites, and cosmic dust to elucidate the origin and evolution of primitive bodies.

(A. M. Nakamura, M. Yasui)

### **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, Y. Hamada)

#### **(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 (S. Yoshida, H. Kawase)

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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.