

# 総合研究大学院大学

The Graduate University for Advanced Studies, SOKENDAI

## 学 生 便 覧

"Student Guide"

2024 年度

(2024. 5. 30 現在)



# 総合研究大学院大学倫理綱領

総合研究大学院大学は、社会の付託を受けた高等教育機関であることの自覚と責任に基づき、ここに倫理綱領を定める。

一、総合研究大学院大学は、その教育研究活動を通じて、基礎学術の発展に先導的な役割を果たし、以って人類の福祉に貢献するべきである。

一、総合研究大学院大学の教員ならびに学生は、大学設立の趣旨に則り、その教育目的実現に向けて勉勵するべきである。

一、総合研究大学院大学において教育研究に従事する者は、他の研究者ならびに教育を受ける者の人格を尊重するべきである。

一、総合研究大学院大学に在籍する者は、良心に基づいて社会的行為規範を遵守し、自己研鑽に努めるべきである。

## Reorganizing the Departmental Structure

SOKENDAI has reorganized the University's departmental structure from the former 6 schools, 20 departments to 1 institute, 1 department, 20 programs as of the 2023 academic year. The treatment of students who enrolled by the academic year 2022 after the restructure is as follows.

1. The affiliation of students who enrolled by the academic year 2022 remains unchanged from the one used since your first enrollment in SOKENDAI. For example, the students who enrolled in Department of Regional Studies of School of Cultural and Social Studies before April 2023 continuously belong to Department of Regional Studies of School of Cultural and Social Studies throughout after the restructure in the academic year 2023. Description of the affiliation on the diploma issued upon graduation will also remain unchanged as Department of Regional Studies of School of Cultural and Social Studies.
2. The graduation requirements for students who enrolled by the academic year 2022 also remain unchanged, and the ones stipulated by the department before the restructure will apply.
3. Subjects in the new curriculum (the new subjects) start in the 2023 academic year. Correspondence Table of the old subjects in the curriculum before April 2023 and the new subjects is on the SOKENDAI website. Students who enrolled by the academic year 2022 should register the subjects for graduation with referring the Correspondence Table.

Please note that the term "program" in this Student Guide should be read as "department" for students who enrolled by the academic year 2022.

## Contents (English Edition)

0 . Academic Calendar . . . . .	1
1 . Student Life	
1 – 1 . Student ID Number . . . . .	2
1 – 2 . Student ID Card . . . . .	2
1 – 3 . Certificates . . . . .	3
1 – 4 . Applications / Notifications for Change of Status . . . . .	7
1 – 5 . Leave of Absence / Return to School / Withdrawal / Removal from Register / Readmission / Stud Abroad . . . . .	10
1 – 6 . Counseling Service for Students . . . . .	13
1 – 7 . Health Examination / Health Management . . . . .	13
1 – 8 . Admission Fee . . . . .	13
1 – 9 . Tuition Fee . . . . .	14
1 – 10 . Student Insurances . . . . .	16
1 – 11 . Support for International Students . . . . .	17
1 – 12 . Extracurricular Activities . . . . .	17
1 – 13 . Safety . . . . .	18
1 – 14 . Commendation and Disciplinary Actions . . . . .	18
2 . Financial Supports	
2 – 1 . Scholarship by the Japan Student Services Organization . . . . .	20
2 – 2 . JSPS Research Fellowships for Young Scientists . . . . .	20
2 – 3 . JSPS Overseas Research Fellowships . . . . .	20
2 – 4 . JSPS Overseas Challenge Program for Young Researchers . . . . .	20
2 – 5 . National Education Loan . . . . .	20
2 – 6 . Other Scholarship Programs and Research Grants . . . . .	20
2 – 7 . Scholarships for International Students . . . . .	21
3 . Course Registration	
3 – 1 . General Information on Course Registration . . . . .	22
3 – 2 . Evaluation Standards of Academic Achievement . . . . .	22
3 – 3 . Requirements for Graduation . . . . .	23
3 – 4 . Studying at Other Universities . . . . .	24
3 – 5 . Receiving Research Supervision at Other Universities . . . . .	26
3 – 6 . International Collaborative Degree Program . . . . .	26
3 – 7 . Other . . . . .	27

4 . Degrees	
4 – 1 . Degrees	29
4 – 2 . Examination of Doctoral Thesis	30
4 – 3 . Publication of Doctoral Thesis	31
5 . Other	
5 – 1 . Non-Regular Student 【Auditing Student with Credit, Auditing Student, Special Auditing Student, Research Student, Special Research Student】	32
5 – 2 . Rules for Handling the Names of Students in SOKENDAI	33
5 – 3 . Managing Your Academic Identity with ORCID	33
5 – 4 . Rules for Writing the Names of the University etc.	33
5 – 5 . Contacts	37
6 . Outlines of Courses Provided by Each Program	
Dissertation Work in Advanced Studies	40
Anthropological Studies	44
Japanese Studies	45
Japanese History	48
Japanese Literature	50
Japanese Language Sciences	55
Informatics	56
Statistical Science	63
Particle and Nuclear Physics	75
Accelerator Science	80
Astronomical Science	86
Fusion Science	90
Space and Astronautical Science	96
Molecular Science	104
Materials Structure Science	112
Global Environmental Studies	114
Polar Science	116
Basic Biology	124
Physiological Sciences	132
Genetics	140
Integrative Evolutionary Science	152
Others	158
Course Code	159
7 . 【Refer to the Japanese edition】	

本学ウェブサイト <https://www.soken.ac.jp>

(注) この学生便覧に掲載している英訳本文は、和文の内容を参考掲載したものです。  
大学としての正式な解釈及び適用は和訳本文によります。

【Attention】

**The English version in this guide is used for reference only and shall not be regarded as a controlling document.**

英語版  
English Edition

## 0. Academic Calendar

SOKENDAI's academic year starts on April 1 and ends on March 31 of the following year. The schedule of the Academic Calendar may vary from one academic year to another, but the basic framework of the schedule remains the same for upcoming academic years.

The Academic Calendar for the academic year 2024 is shown below. The calendar is also available on SOKENDAI website.

([https://www.soken.ac.jp/en/education/curriculum/academic\\_cal/](https://www.soken.ac.jp/en/education/curriculum/academic_cal/))

### Academic Calendar 2024

[1st Semester]	2024. 4. 1	～	2024. 9.30
Spring Holiday	2024. 4. 1	～	2024. 4. 8
Entrance Ceremony & Freshman Course	2024. 4. 9	～	2024. 4.12
Course Registration Period	2024. 4. 9	～	2024. 4.22
Course Confirmation Period	2024. 4.23	～	2024. 4.30
1st Semester Classes	2024. 4.15	～	2024. 8. 1
Supplementary Lecture & Examination Period	2024. 8. 2	～	2024. 8.16
Summer Holiday	2024. 8.19	～	2024.10. 7
Graduation Ceremony	2024. 9.27		
[2nd Semester]	2024.10. 1	～	2025. 3.31
Entrance Ceremony & Freshman Course	2024.10. 8	～	2024.10.11
Course Registration Period	2024.10. 8	～	2024.10.22
Course Confirmation Period	2024.10.23	～	2024.10.29
2nd Semester Classes	2024.10.15	～	2025. 2. 5
Winter Holiday	2024.12.30	～	2025. 1. 3
Supplementary Lecture & Examination Period	2025. 2. 6	～	2025. 2.20
Spring Holiday	2025. 2.21	～	2025. 3.31
Graduation Ceremony	2025. 3.24		



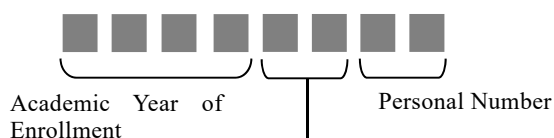
## 1. Student Life

### 1-1. Student ID Number (*gakuseki bango*)

A student ID number is assigned to each enrolled student. This number is required for various clerical procedures and must be exactly remembered.

#### \*Student ID Number

Student ID Number consists of 4 digits of “Academic Year of Enrollment,” 2 digits of “Program,” and 2 digits of “Personal Number.”



Regular Student						
	Programs					
	Anthropological Studies	31	Particle and Nuclear Physics	38	Global Environmental Studies	45
	Japanese Studies	32	Accelerator Science	39	Polar Science	46
	Japanese History	33	Astronomical Science	40	Basic Biology	47
	Japanese Literature	34	Fusion Science	41	Physiological Sciences	48
	Japanese Language Science	35	Space and Astronautical Science	42	Genetics	49
	Informatics	36	Molecular Science	43	Evolutionary Studies of Biosystems	50
	Statistical Science	37	Materials Structure Science	44		
Research Student			R0	Auditing Student with Credits		N0
Auditing Student			O0	Special Auditing Student		T0
Special Research Student			K0			

### 1-2. Student ID Card (*gakuseisho*)

A student ID card is distributed to each student at the time of enrollment. This card identifies its holder as a SOKENDAI student; the card must always be carried and should not be lost or damaged.

- Student ID card is valid for 3 years for the 3-year doctoral program and 5 years for the 5-year doctoral program. After the expiration date, the student ID card should be returned immediately to the Student Affairs Section, Hayama.
- Upon graduation, withdrawal, or removal from SOKENDAI, a student must return his / her student ID card immediately.
- If a student ID card is lost, stolen, or unusable due to damage, the Application Form for Reissuance of Student ID Card (学生証再発行願) should be submitted promptly to the Student Affairs Section, Hayama. After reissuing, the old student ID card will be invalid and cannot be used. If the old student ID card is found, please return it immediately.
- The Application Form for Reissuance of Student ID Card is downloadable from SOKENDAI website. (<https://www.soken.ac.jp/en/campuslife/documents/>)

◆Contact

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: gakusei@ml.soken.ac.jp)

1-3. Certificates

- Certificates to be issued by SOKENDAI

◎For Enrolled Students

Issued by	Name of Document	Contents	Notes
Hayama Headquarter	Certificate of Enrollment (在学証明書)	Certifies that the applicant is enrolled in SOKENDAI.	*For currently enrolled, regular students only
	Certificate of Registration (在籍証明書)	Certifies that the applicant is registered as a student, but currently taking a leave of absence.	*For regular students on leave of absence only
	Certificate of Period of Enrollment (在籍期間証明書)	Certifies the applicant's enrolled period at SOKENDAI.	*For non-regular students such as Research Student
	Academic Transcript (成績証明書)	Certifies the applicant's academic record for the credits of the courses completed at SOKENDAI.	
	Certificate of Expected Graduation (修了見込証明書)	Certifies that the applicant will complete a doctoral program at SOKENDAI, and be conferred a doctoral degree.	In principal, issued only to students in the final year.
	Certificate of Expected Conferment of a Master's Degree (修士学位取得見込証明書)	<u>Certificates that the applicant expects to be conferred a master's degree.</u>	See the issuance conditions in the margin.*
	Certificate of Qualification for a Master's Degree (修士学位取得資格者証明書)	Certifies that the applicant has the Qualification for a Master's Degree.	*Issued only to those who have enrolled <u>at least 2 years</u> in the 5-year doctoral program and passed the required examination.

	Certificate of Expected Withdrawal with Credit (単位取得退学見込証明書)	Certifies that the applicant has obtained the credits required to complete the course, and the applicant is expected to withdraw without submitting the doctoral thesis.	Issued only to students in the final year.
	Certificate of Health Examination (健康診断証明書)	Certifies the result of the applicant's annual health examination.	*The English certificate requires longer time for issuance. Please submit your request well in advance.
	Certificate of Commutation (通学証明書)	Issued to those who purchase a Student Commuter Pass for Trainee to commute for a long period of time to a location other than his / her own campus for attending courses, conducting research activities, and so forth. *For regular students only	<u>Only in Japanese</u> *Please apply well in advance. About three weeks are needed for issuance.
	Certificate of Japanese Government Scholarship Student (国費外国人留学生証明書)	Certifies that the applicant is a Japanese Government Scholarship Student.	*Required for Japanese Government Scholarship Students to extend the period of stay in Japan.
	Certificate of Receiving Monbukagakusho Honors Scholarship for Privately-Financed International Students (学習奨励費受給証明書)	Certifies that the applicant receives the Monbukagakusho Honors Scholarship for Privately-Financed International Students.	*For the recipients of the said scholarship only
Program Office	Student Discount Ticket (学割証)	Issued to those who purchase JR tickets to travel more than 100km	<u>Only in Japanese</u> *For regular students only

\*The conditions for issuance of “Certificate of Expected Conferment of a Master's Degree” are as follows: (1) If you plan to obtain a master’s degree within one year from the date of issue. (2) You are expected to acquire the required number of credits (30 credits) by the scheduled date of obtaining your master's degree. (3) Indication of your intention to withdraw; in principle, an Application for

Withdrawal must be submitted. Instead of the Application for Withdrawal, a document (free format) which the chief supervisor indicates he / she instructs the student to pursue a master's degree on the assumption of the student's withdrawal may be submitted.

\*If any other certificate mentioned above is required, please contact the relevant section.

◎For Alumni / Those Who Have Withdrawn

Target Group	Name of Document	Contents	Notes
Doctoral Degree (Ph.D)	Certificate of Graduation (修了証明書)	Certifies that the applicant completed a doctoral program and was conferred a degree of Doctor of Philosophy by SOKENDAI.	
	Academic Transcript (成績証明書)	Certifies the applicant's academic record of the courses completed at SOKENDAI.	Can be issued to students withdrew from SOKENDAI.
Withdrawal	Certificate of Withdrawal with Credits (単位取得退学証明書)	Certifies that the applicant withdrew from SOKENDAI after satisfying SOKENDAI's requirements for completing a doctoral program (the applicant was enrolled for a period of 3 or 5 years or longer and earned the credits required by each program).	
	Certificate of Withdrawal from the University (退学証明書)	Certifies that the applicant withdrew from SOKENDAI.	
	Certificate of Period of Registration (在籍期間証明書)	Certifies the applicant's registered period at SOKENDAI until the day of withdrawal.	
	Certificate of Conferment of a Master's Degree (修士学位取得証明書)	Certifies that the applicant earned a master's degree from SOKENDAI.*	

\*No Certificate of Graduation is issued for a master's degree. At SOKENDAI, a master's degree is granted to a student who has satisfied the requirements for a master's degree upon withdrawal from his / her doctoral program. This practice is not formally regarded as graduation.

\*The name on certificates will be the one used by the applicant while attending SOKENDAI when

it is applied after the graduation or withdrawal.

\*If any other certificate mentioned above is required, please contact the relevant section.

- Certificate Issuance Fee

Certificates are issued free of charge (as of April 1, 2024). Alumni and withdrawals owe shipping costs.

- Issuance of Certificates

Make a request by submitting the Application Form for Certificates (証明書発行申請書) to the Program Office or to the Educational Affairs Section, Hayama.

- Notes:

Certificates are issued by the Educational Affairs Section, Hayama. Please allow approximately two weeks for mailing, etc. The Hayama Headquarters will, in principle, send the certificate to the Program Office within 3 days from its receipt of the application (excluding Saturdays, Sundays, national holidays, and the period from December 29 to January 3).

- Identity Verification

An identity verification of applicants is necessary to proceed on the application.

- Applying in Person at the Counter of Program Office or Hayama Headquarters

There will be a case to ask to show an identity verification documents (student ID card, driver license and others).

- Applying by E-mail, Post or FAX

Please send an application form and a copy of identity verification document. After the confirmation, the latter will be discarded or sent back to the applicant with the requested certificate.

- Applying by Proxy

Application by a proxy can be accepted if there is a difficulty in applying by oneself.

For any question, please refer to the Program Office or to the Educational Affairs Section, Hayama.

- Student Discount Ticket (学割証 only in Japanese) \*for Regular Students only

Student Discount Ticket can be issued for students who travel more than 100 km one way on JR lines. Please submit the Application Form for Student Discount Ticket (学割証発行申請書) to the Program Office which issues them.

- Purchase of Student Commuter Passes (*tsugaku teikiken*) \*for Regular Students only

A student can use a student ID card to purchase a commuter pass at a student discount rate for the route between the station nearest to the residence and the station nearest to the Program. However, the card may not be valid for some transportation services, including private buses. In such cases, Certificate of Commutation (通学証明書) is available when purchasing a student commuter pass. The Application Form for Certificates should be submitted to the Program Office or to the Educational Affairs Section, Hayama.

### ★Certificates for International Students

- **Certificate of Japanese Government Scholarship Student** (国費外国人留学生証明書)

This certificate is issued to Japanese government scholarship students when certification of scholarship status is required for visa renewal or agreement to rent a house.

- **Certificate of Receiving Monbukagakusho Honors Scholarship for Privately-Financed International Students** (文部科学省外国人留学生学習奨励費受給証明書)

This certificate is issued for those receiving the scholarship when certification on the scholarship is required for visa renewal or agreement to rent a house.

★The Application Form for Certificates are downloadable from SOKENDAI website

(<https://www.soken.ac.jp/en/campuslife/certificate/>)

### ◆Contact

#### 【General Information】

Educational Affairs Section, Hayama (Tel: 046-858-1524, e-mail: [kyomu@ml.soken.ac.jp](mailto:kyomu@ml.soken.ac.jp))

#### 【For International Students】

Student Affairs Section, Hayama (Tel: 046-858-1527, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

\*1) “Parent Institute (Kiban-kikan)”

The twenty research institutes affiliated with SOKENDAI are collectively called “Parent Institutes.”

\*2) “Program Office (Course tanto-kakari)”

Each Parent Institute has administration office handling education / student affairs on behalf of the relevant program of SOKENDAI.

### 1-4. Applications / Notifications for Change of Status

For the cases listed below, a student should submit an appropriate document to the Program Office or the Educational Affairs Section, Hayama. Especially, change of address must be informed immediately as it is required when contacting with a student.

Please contact Program Office or to the Educational Affairs Section, Hayama for inquiries.

Name of Document	Occasion	Notes
Application Form for Leave of Absence (休学願)	Leave of Absence	In case of unable to attend school for more than 2 months.
Application Form to Return from Leave of Absence (復学願)	Return to school before the end of the approved absence period	The date of return to school should be the first day of each month.
Notification to Return from Leave of Absence (復学届)	Return to school after the end of the approved absence period	

Application Form to Transfer University (転学願)	Transfer from SOKENDAI to another university	
Application Form for Study Abroad (留学願)	Studying abroad	The start or end date of the study period should be the first or last day of each month. The period of study abroad is up to one year. "Notice for Visit to Foreign Countries" is not required.
Application Form for Internal Transfer (コース変更願/移籍・転専攻願)	Transfer to another program	
Application Form to Withdraw / Application Form for Master's Degree (退学願/修士学位申請書)	Withdrawal from SOKENDAI	The date of withdrawal should be the last day of each month. The reason for withdrawal should be as specific as possible.
Notification of Change of Address (住所等変更届)	Change of address, means or route of commutation	
Notification of Change of Emergency Contact (緊急連絡先変更届)	Change of emergency contact	
Notification of Change of Name (改姓(名)届)	Change of last (first) name	The applicant may use his / her former name or write both name on his / her family register and his / her former name. Please also refer to the "Rules for Handling the Names of Students in SOKENDAI" (on page ●).
Application Form for Re-issuance of Student ID Card (学生証再発行願)	Loss of student ID card	Expired student ID cards are invalid and cannot be used. Please make a request to reissue promptly.
Notification of Visit to Foreign Countries (海外渡航届)	Going abroad	In case of travel to a country or region that falls under the category of Level 1 or under

		in the Overseas Travel Safety Information or the Travel Advice and Warning on Infectious Diseases issued by the Ministry of Foreign Affairs of Japan (MOFA) to a country
Application for Overseas Travel (海外渡航申請書)	Going abroad	In case of travel to a country or region that falls under the category of Level 2 or above in the Overseas Travel Safety Information or the Travel Advice and Warning on Infectious Diseases issued by the Ministry of Foreign Affairs of Japan (MOFA) to a country
Permission for Studying While in Employment (在職在学許可書)	Getting a job while still in university	A regular employee or being employed in a position for at least one year and at least 30 hours per week of employment.
Application for Establishment / Renewal of an Extracurricular Activity (課外活動団体許可・継続願)	Establishing or Renewing of Extracurricular Activity	
Dissolution Notification of Extracurricular Activity (課外活動団体解散届)	Dissolving Extracurricular Activity	
Application Form for Joining an Outside Party (学外団体加入許可願)	Joining an Outside Party	
Registration Document for Bank Account (預金口座振替依頼書)	Changing the bank account for tuition fee	

★Applications / Notifications for Change of Status can be downloaded from SOKENDAI website (<https://www.soken.ac.jp/en/campuslife/documents/>).

【Note1】 The documents of an extracurricular activity is not available on SOKENDAI website.  
Please contact the Student Affairs Section, Hayama.



The Registration Document for Bank Account (預金口座振替依頼書) is not available on SOKENDAI Website. Please contact the Accounting Section, Hayama to request the form.

【Note2】 Forms regarding Overseas Travel (<https://www.soken.ac.jp/campuslife/abroad>) can be downloaded from our website

(<https://www.soken.ac.jp/en/campuslife/abroad/overseas-travel-approval.html>).

#### ◆Contact

##### 【General Information】

Educational Affairs Section, Hayama (Tel: 046-858-1582, e-mail: [kyomu@ml.soken.ac.jp](mailto:kyomu@ml.soken.ac.jp))

##### 【Student ID Card / Extracurricular Activity / Travel Abroad】

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

##### 【Tuition Payment】

Accounting Section, Hayama (Tel: 046-858-1514, e-mail: [keiri1@ml.soken.ac.jp](mailto:keiri1@ml.soken.ac.jp))

### 1-5. Leave of Absence / Return to School / Withdrawal / Removal from Register / Readmission / Study Abroad

In the case of withdrawing from the University, or prolonged absence from school due to illness or for other reasons, the procedures prescribed below must be followed.

Occasion	Submission Period and Summary
①Leave of Absence ( <i>kyugaku</i> )	<p><u>Submission Period: One month before (Two months before at the end of the academic year)</u></p> <p><u>Submit to: Program Office</u></p> <ol style="list-style-type: none"> <li>1. To be absent from school continuously for 2 months or more due to illness or for any other reasons, the Application Form for Leave of Absence (休学願) signed by a student's supervisor (<i>shido kyoin</i>) should be submitted to the Program Office (a note from a medical doctor is also required if it is due to illness). Leave of absence requires Permission by Dean, Graduate Institute for Advanced Studies.</li> <li>2. Absence from school may not exceed 2 years in total.</li> <li>3. The period of leave of absence is excluded from the period of attendance at school.</li> <li>4. If leave of absence is approved before the tuition payment deadline (April for the first semester or October for the second semester), the tuition payment for the approved absence period will be waived. If leave of absence is approved after the tuition payment deadline, the tuition fee for the corresponding semester must be paid in full.</li> <li>5. Prior to application for leave of absence, it is recommended to consult with the supervisor (<i>shido kyoin</i>) and the Program Office,</li> </ol>

	<p>or the Educational Affairs Section, Hayama to ensure that there are no conflicts with tuition payment, course registration before absence from school or after reenrollment and the period of attendance at school.</p> <p>6. Japan Student Services Organization scholarship recipients must attach the Application (Notification) for Change of Registration Status.</p>
<p><b>②Return to School</b> (<i>fukugaku</i>)</p>	<p><u>Submission Period: One month before (Two months before at the end of the academic year)</u></p> <p><u>Submit to: Program Office</u></p> <ol style="list-style-type: none"> <li>1. When the approved absence period expires, the Notification of Return from Leave of Absence (復学届) should be submitted to the Program Office.</li> <li>2. If the reason for absence from school is resolved before the end of the approved absence, a student may reenroll without waiting for expiration of the approved absence period. For reenrollment, the Application Form to Return from Leave of Absence (復学願) signed by a student's supervisor (<i>shido kyoin</i>) should be submitted one month in advance to the Program Office. Reenrollment requires permission by Dean, Graduate Institute for Advanced Studies.</li> <li>3. Japan Student Services Organization scholarship recipients must attach the Application (Notification) for Change of Registration Status.</li> </ol>
<p><b>③Withdrawal</b> (<i>taigaku</i>)</p>	<p><u>Submission Period: One month before (Two months before at the end of the academic year)</u></p> <p><u>Submit to: Program Office</u></p> <ol style="list-style-type: none"> <li>1. To withdraw from the University, the Application Form to Withdraw (退学願) signed by a student's supervisor (<i>shido kyoin</i>) should be submitted one month in advance to the Program Office. Withdrawal requires permission by the president of University.</li> <li>2. If withdrawal is approved before the tuition payment deadline (April for the first semester or October for the second semester), the tuition payment after the withdrawal will be waived. If withdrawal is approved after the tuition payment deadline, the tuition fee for the corresponding semester must be paid in full.</li> <li>3. Prior to application for withdrawal, it is recommended to consult with the supervisor (<i>shido kyoin</i>) and the Program Office, or the Educational Affairs Section, Hayama.</li> </ol>

<p><b>④Study Abroad</b> (<i>ryugaku</i>)</p>	<p><u>Submission Period: One month before (Two months before at the end of the academic year)</u></p> <p><u>Submit to: Program Office</u></p> <p>To study abroad, the Application Form for Study Abroad (留学願) signed by the supervisor (<i>shido kyoin</i>) should be submitted to the Program Office. Study abroad requires permission by Dean, Graduate Institute for Advanced Studies.</p> <ol style="list-style-type: none"> <li>1. Fundamentally, study abroad is limited to 1 year. The period may be extended up to one more year if the extension is necessary owing to unavoidable circumstance and is accepted by Dean, Graduate Institute for Advanced Studies.</li> <li>2. The tuition fee must be paid for the period of study abroad.</li> <li>3. Prior to application for study abroad, it is recommended to consult with the supervisor (<i>shido kyoin</i>) and the Program Office, or the Educational Affairs Section, Hayama.</li> </ol>
--	---

**⑤Removal from Registration** (*joseki*)

Students will be removed from the registration for the following causes:

- The maximum period of enrollment is exceeded.
- A student is not able to return to school after an absence period of 2 years.
- A student fails to pay the admission fee by the specified date.
- A student fails to pay the tuition fee and has not paid it even after being reminded to do so.

**⑥ Internal Joint Advising Program**

A student who wishes to receive joint research guidance from another program than own, please consult with your supervisor and the Program Office at each institute.

**⑦Transfer to Another Program**

Students who wish to transfer to another program must consult thoroughly with the supervisor and the Program Office they belong first, fill out "Application Form for Internal Transfer (コース変更願/移籍・転専攻願)," obtain the approval signature from the supervisor (*shido kyoin*), and submit it to the Program Office they belong.

When transferring the program, a screening process will be conducted to determine the ability of the applicants to complete the doctoral program in the new program.

If you wish to transfer to another program, please confirm the Program Office you wish to enter about the selection criteria and other things.

**⑧Transfer to Another University** (*tengaku*)

If a student wishes to transfer to another graduate school, the Application Form to Transfer University (転学願) signed by the supervisor (*shido kyoin*) should be submitted to the Program Office. Please consult with the supervisor (*shido kyoin*) and the Program Office at each institute prior to transfer to another university.

**⑨Readmission** (*sai-nyugaku*)

If a student who has withdrawn from the University wishes to reenroll in the initial school at the Graduate Institute for Advanced Studies, the student may reenroll if the enrollment does not cause

any hindrance to education or research activities at the Graduate Institute for Advanced Studies. Reenrollment for the appropriate year level of the Graduate Institute for Advanced Studies may be permitted by passing an entrance examination. Prior to submitting application for reenrollment, it is recommended to consult with the Program Office.

◆**Contact**

【General Information】

Educational Affairs Section, Hayama (Tel: 046-858-1523/1582, e-mail: kyomu@ml.soken.ac.jp)

【Readmission】

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: gakusei@ml.soken.ac.jp)

### **1-6. Counseling Services for Students**

- General Student Life Issues

Please contact each Program Office or the Student Affairs Section, Hayama, for counseling services about general school life issues.

- Mental Healthcare

Mental healthcare services are provided monthly by counselors at each Parent Institute for students who suffer from mental health problems such as communication issues with colleagues or his / her personality.

Please contact the Program Office to schedule your appointment with a counselor.

SOKENDAI offers a counseling service for international students. "TELL Counseling" will provide its service for full time international students and to immediate family members residing in Japan. Please note that this service will not be available after graduation or for those who withdrew from SOKENDAI. For more information about this service, contact Student Affairs Section, Hayama.

- Consultation Service about Educational Problems

Email consultation service at Hayama Headquarters accepts inquiries such as harassment problems. (e-mail: gakusei\_consult@ml.soken.ac.jp)

◆**Contact**

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: gakusei@ml.soken.ac.jp)

### **1-7. Health Examination / Health Management**

SOKENDAI provides health examinations for all students (excluding Non-Regular Students) once a year. For details, please contact each Program Office or the Student Affairs Section, Hayama.

◆**Contact**

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: gakusei@ml.soken.ac.jp)

### **1-8. Admission Fee (*nyugakuryo*)**

Those who wish to request postponement or exemption of payment of the admission fee are required to submit the application form to the Student Affairs Section, Hayama before the registration deadline.

If the application is approved for postponement, the student must pay the admission fee by

September 15 (or March 15 for registration in the second semester).

If the application is for exemption rejected, a student must pay the admission fee within 14 days from the notification date.

If those who are notified of the approval of postponement or the disapproval of exemption of the admission fee by SOKENDAI do not pay the admission fee by the appointed day, the student will be expelled in accordance with the Code of SOKENDAI.

◆ **Contact**

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: gakusei@ml.soken.ac.jp)

**1-9. Tuition Fee (*jogyoryo*)**

① **Tuition Fee**

The annual tuition fee is 535,800 yen (for the academic year 2024).

\*The tuition fee may be revised in the future.

② **Payment of the Tuition Fee**

1. Tuition fee should be paid by installment payment, one for the first and one for the second semester.
2. In principle, the tuition fee is withdrawn from the registered bank account.
3. To set up automatic withdrawal from the bank account, students must submit “Registration Document for Bank Account / Application for the Use of Automatic Payment.” This Form is required to be resubmitted for any changes made to the bank account.
4. If a student needs “Registration Document for Bank Account / Application for the Use of Automatic Payment,” please contact the Accounting Section, Hayama.
5. The tuition fee may be paid to SOKENDAI bank account, instead of withdrawing from the student’s bank account. Please note that the transfer fee will be charged to the payer.
6. The tuition fee for the entire year may be paid at once upon tuition payment for the first semester. Requests should be made to the Accounting Section, Hayama.
7. In principle, any tuition fee may not be refunded once it is paid.

③ **Payment Deadline**

1. The installments of the tuition fee for the first and the second semesters will be withdrawn from the registered bank account on April 27 and October 27 respectively (or on the next business day if the bank is closed on that day). The appropriate sum should be deposited into the bank account by one day before the withdrawal. If the tuition cannot be withdrawn from the bank account due to insufficient funds, it will be withdrawn on the 27th day of the next month (or on the next business day if the bank is closed on that day). The withdrawal fee will be borne by SOKENDAI.
2. According to the code of SOKENDAI, students who fail to pay tuition fees by the due date will be expelled.
3. A student who has not paid tuition fee is not permitted to apply for any changes in status, including completion, leave of absence from university, and withdrawal from university.
4. If a delay in tuition payment is expected, a student must consult with the Program Office in advance.

#### ④ Exemption from / Postponement of Tuition Payment

##### ● Students Eligible to Be Exempted from Tuition Payment

- (1) A student who demonstrates financial hardship and maintains an excellent academic record
- (2) A student who has difficulties in paying the tuition fee because a person mainly funding his / her school expenses has died or because the student or the main funding person has suffered hardship from damage caused by natural disasters, such as storm and flood, within six months prior to the due date of tuition payment for each semester
- (3) A student to whom (2) is applicable and whom the President recognizes as having reasonable cause to be exempted from tuition fee

##### ● Students Eligible to Postpone Tuition Payment

- (1) A student who has difficulties in paying tuition fee by the due date of payment for economic reasons and maintains an excellent academic record
- (2) A student who is missing
- (3) A student who has difficulties in paying the tuition fee because the student or a person mainly funding his / her school expenses has suffered hardship from damage caused by natural disasters
- (4) A student for whom unavoidable circumstances is recognized

##### ● Procedures

To apply for the exemption or postponement, the following documents should be submitted to the Student Affairs Section, Hayama by April 30 for the first semester or by October 31 for the second semester (The application documents should be submitted through the Program Office by the deadline).

- (1) Tuition Exemption Request (授業料免除願) for exemption
- (2) Request for Postponing Payment of Tuition (授業料徴収猶予願) for postponement  
This application is also required for the tuition exemption.

- (3) Family Status Report

- (4) Certificates (attach all applicable from (a) to (d) below.)

(a) To apply for the exemption / postponement because a person funding the student's school expenses has died, a document to certify the person's death, such as a certificate of death and postmortem certificate, is required.

(b) To apply for the exemption / postponement because the student / the funding person has suffered hardship from damage caused by natural disasters, Certificate of Victim (罹災証明書) and a document to certify the amount of damage (issued by the appropriate municipal government, police department, or fire department) are required.

(c) Document to certify income status

(d) Other certification documents for reference

##### ● Amount Exempted from the Tuition Fee

If the exemption is approved, all or half the tuition fee for the corresponding semester is exempted.

##### ● Notes

- (1) When the Application for Tuition Exemption is filed, tuition payment may be postponed until a decision on the exemption is made.
- (2) If the application is rejected, or if a half exemption of the tuition fee is approved, the specified amount of the tuition fee must be paid by the payment due date.

- **Procedures for Tuition Payment at the Time of Change in Status**

Different procedures for tuition payment apply depending on the period of absence from school or withdrawal from the University. See “1-5. Leave of Absence, Return to School, Withdrawal, Removal from Register, Readmission, and Study Abroad” (on page 10).

- **For Japanese Government Scholarship Students**

Japanese government scholarship students are exempted from tuition payment.

- ◆ **Contact**

- 【General Information】

Educational Affairs Section, Hayama (Tel: 046-858-1582, e-mail: kyomu@ml.soken.ac.jp)

- 【Tuition Exemption / Postponement / For International Students】

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: gakusei@ml.soken.ac.jp)

- 【Tuition Payment】

Accounting Section, Hayama (Tel: 046-858-1514, e-mail: keiri1@ml.soken.ac.jp)

### **1-10. Student Insurances (*gakusei hoken*)**

SOKENDAI requires that all students buy the “Personal Accident Insurance for Students Pursuing Education and Research” (“Gakkensai”) and the “Liability Insurance Coupled with Gakkensai” (“Futaibaiseiki”) offered by the Japan Educational Exchanges and Services (JEES) as security against accidents.

At the time of enrollment, students must buy these insurances for the standard duration of study at school (3 years for 3-year doctoral program students and 5 years for 5-year doctoral program students). If a student continues to be enrolled after the insurance period expires, the student must pay the additional premium to extend the insurance period.

In case of any changes of status such as absence from school, students must turn in the required documents. (The insurance coverage may be changed accordingly.) For details, contact the Student Affairs Section, Hayama.

Any accident or damage should be immediately reported to the Student Affairs Section, Hayama. At the same time, the necessary forms should be submitted to the section. After treatment is completed, insurance claims should be filed to the Student Affairs Section, Hayama.

- **Personal Accident Insurance for Students Pursuing Education and Research (“Gakkensai”)**

This insurance aims to reduce economic hardship, including treatment expenses, when an injury, residual disability, or death of a student occurs in the course of educational / research activities, commutation, or extracurricular activities.

- **Liability Insurance Coupled with Gakkensai (“Futaibaiseiki”)**

This insurance is intended to compensate for legal costs arising from a student injuring any other person or damaging any other person’s property in the course of regular academic activities, school events, or related travels.

- ◆ **Contact**

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: gakusei@ml.soken.ac.jp)

## 1-11. Support for International Students

### ● Accommodations for International Students

SOKENDAI does not have own accommodations for International Students. However, International Students may utilize the accommodations of the Parent Institutes and / or a public rental housing of Urban Renaissance Agency (UR agency). For details, contact the Program Office or the Student Affairs Section, Hayama. Moreover, SOKENDAI may become a guarantor when international students rent a private apartment, on condition that a student joins “Comprehensive Renter’s Insurance for Foreign Students Studying in Japan” as mentioned below.

### ● Comprehensive Renter’s Insurance for Foreign Students Studying in Japan

(留学生住宅総合補償制度)

This system aims to ease international students’ transition into private residences by reducing their difficulties in finding guarantors and lessening the mental / economic burden of the guarantors. For details, see the following website.

(<https://www.soken.ac.jp/en/campuslife/international/supports/insurance/>)

### ◆Contact

Student Affairs Section, Hayama (Tel: 046-858-1527, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

## 1-12. Extracurricular Activities

SOKENDAI students may establish organizations for extracurricular activities that are compatible with SOKENDAI educational objectives. The procedures for establishing extracurricular activities are classified as follows.

Procedure	Application / Notification Form	Timing
Establishing New Extracurricular Activities	Application for Establishing / Renewal of an Extracurricular Activity (課外活動団体許可・継続願)	At any time
Continuing Extracurricular Activities in May of the Following Academic Year or Later	Application for Establishing / Renewal of an Extracurricular Activity (課外活動団体許可・継続願)	End of April
Dissolving of Extracurricular Activities	Dissolution Notification of Extracurricular Activity (課外活動団体解散届)	At any time
Joining an Outside Party	Application Form for Joining an Outside Party (学外団体加入許可願)	At any time (consult in advance if a certificate of permission to join issued by the outside party is required.)

### ◆Contact

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))



### 1-13. Safety

#### ●Safety Confirmation System ‘ANPIC’

SOKENDAI has introduced the safety confirmation system ‘ANPIC.’ In case of emergency, ANPIC sends emails to the accounts which are registered in advance. For the details of registration, see the following website: <https://www.soken.ac.jp/en/news/2018/20180920.html>

Some of the Parent Institutes provide disaster drills such as firefighting training and it is recommended to join the event.

For inquiries regarding safety-related matters, contact the Program Office or the Student Affairs Section, Hayama.

#### ◆Contact

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

#### ●Overseas Crisis Management Service “Anshin Support Service”

SOKENDAI has an emergency consultation desk that can be consulted 24 hours a day, 365 days a year if students are involved in an emergency or serious trouble, such as loss of passport, being involved in incidents, accidents, natural disasters, etc., while traveling abroad.

Students are required to register to the Overseas Crisis Management Service when traveling abroad for educational and research activities at SOKENDAI (free of charge). Or even if you travel overseas for other reasons, you can enroll in overseas risk management (This service requires a fee).

For the details of this service, please see our website (<https://www.soken.ac.jp/campuslife/abroad/>).

In addition, regarding some projects, when students travel abroad, SOKENDAI has a comprehensive contract for overseas travel insurance. In this case, the insurance fee will be borne by SOKENDAI.

#### ◆Contact

Academic Affairs Section, Hayama (Tel: 046-858-1531, e-mail: [gshien@ml.soken.ac.jp](mailto:gshien@ml.soken.ac.jp))

Student Affairs Section, Hayama (Tel: 046-858-1525, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

### 1-14. Commendation and Disciplinary Actions

The President may do the commendation and the discipline to a student pursuant to the Code of SOKENDAI.

[Reference: The Code of SOKENDAI (*gakusoku*)]

59. Commendation: The President may award a student with a commendation for his / her achievement that are deemed to be worthy of the honor.

60.1. The President may discipline a student who violates the university regulations or other rules, and is found to deserve punishment.

60.2. The types of disciplinary punishment referred to in Article 60.1 above shall be expulsion (*hogaku*), suspension (*teigaku*), and / or warning (*kunkoku*).

60.3. Expulsion, as referred to in Article 60.2 above, may be applied to those students falling within any of the following categories:

- (1) Students of delinquent behavior and regarded as one without any prospect for reform
- (2) Students neglecting studies and regarded as one without any prospect for academic completion
- (3) Students continuously being absent without justifiable reason
- (4) Students disturbing the university order and acting in violation of their duties as a member of SOKENDAI

## 2. Financial Supports

### 2-1. Scholarship by the Japan Student Services Organization *For Japanese Students Only*

This scholarship is only available to Japanese Students. Please see the corresponding Japanese section for the details.

### 2-2. JSPS Research Fellowships for Young Scientists

For details, see the following website. <https://www.jsps.go.jp/english/e-pd/index.html>

#### ◆Contact

Research Coordination Section, Hayama (Tel: 046-858-1608, e-mail: [kenkyo@ml.soken.ac.jp](mailto:kenkyo@ml.soken.ac.jp))

### 2-3. JSPS Overseas Research Fellowships

For details, see the following website. <https://www.jsps.go.jp/english/e-ab/index.html>

#### ◆Contact

Research Coordination Section, Hayama (Tel: 046-858-1608, e-mail: [kenkyo@ml.soken.ac.jp](mailto:kenkyo@ml.soken.ac.jp))

### 2-4. JSPS Overseas Challenge Program for Young Researchers

For details, see the following website. <https://www.jsps.go.jp/english/e-ab/index.html>

(Overview)

#### ◆Contact

Research Coordination Section, Hayama (Tel: 046-858-1608, e-mail: [kenkyo@ml.soken.ac.jp](mailto:kenkyo@ml.soken.ac.jp))

### 2-5. National Education Loan

SOKENDAI students (including newly enrolled students) are eligible in applying the "National Education Loan" program. This program is a public system for financing education expenses. Students may borrow up to 3,500,000 yen which is to be repaid within 18 years.

For details, contact a nearby branch of the Japan Finance Corporation (日本政策金融公庫) or the Educational Loan Call Center (Navigation-dial: 0570-008656 or 03-5321-8656).

Website: <https://www.jfc.go.jp/n/finance/search/ippan.html>

### 2-6. Other Scholarship Programs and Research Grants

#### • Grants Offered by Private Foundations

Of the scholarship programs offered by private organizations, scholarships that can be applied for directly by students (Direct application type) will be notified on the portal site of Campus Plan (<https://www.soken.ac.jp/en/campuslife/campusplan/>). And the information on other scholarship programs and research grants that require university recommendations (University recommendation type) is posted on our website.

Scholarship Programs : <https://www.soken.ac.jp/en/campuslife/international/international.html>

Research Grants (Japanese only) : [https://www.soken.ac.jp/education/dispatch/grant\\_info/](https://www.soken.ac.jp/education/dispatch/grant_info/)

The application method differs for each private foundation, so it is recommended to check the posted information on the website and apply with plenty of time to spare.

#### ◆Contact

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: [gakusei@ml.soken.ac.jp](mailto:gakusei@ml.soken.ac.jp))

Research Coordination Section, Hayama (Tel: 046-858-1608, e-mail: kenkyo@ml.soken.ac.jp)

## **2-7. Scholarships for International Students**

### **● Scholarships from Private Foundations**

Of the scholarship programs offered by private organizations, scholarships that can be applied for directly by students (Direct application type) will be notified on the portal site of Campus Plan (<https://www.soken.ac.jp/en/campuslife/campusplan/>). And the information on other scholarship programs which require university recommendations (University recommendation type) is posted on our website (<https://www.soken.ac.jp/en/campuslife/international/international.html>).

As the application method varies depending on the foundation, it is recommended to check the information provided on the website and apply with ahead of time.

### **◆ Contact**

Student Affairs Section, Hayama (Tel: 046-858-1526, e-mail: gakusei@ml.soken.ac.jp)

### 3. Course Registration (*rishu*)

#### 3-1. General Information on Course Registration

1. Course registration and course cancellation must be done during the period specified for each semester. Please note that registration and cancellation outside of these periods will not be accepted in principle.
2. To make a study / research plan, a student should consult with the main supervisor (*shunin shido kyoin*).
3. Course registration is done using the online system (CampusPlan). For more information on the operation manual and other details, please see the SOKENDAI website (<https://www.soken.ac.jp/en/campuslife/campusplan/>).
4. For the titles and outlines of courses provided by Graduate Institute for Advanced Studies, refer to "6. Outlines of Courses" (page 39 onward).

#### Web Syllabus

[https://cplan-public.soken.ac.jp/public/web/Syllabus/WebSyllabusKensaku/UI/WSL\\_SyllabusKensaku.aspx?culture=en](https://cplan-public.soken.ac.jp/public/web/Syllabus/WebSyllabusKensaku/UI/WSL_SyllabusKensaku.aspx?culture=en)

5. A Student who accomplishes a certain level of academic performance in registered courses earn the prescribed number of credits for each course.
6. A Student may register any course that has been failed; however, any passed courses may not be registered again.
7. Any questions on course registration should be directed to the Program Office or to the Educational Affairs Section, Hayama in advance.

#### 3-2. Evaluation Standards of Academic Achievement

Student achievement of course work will be evaluated and represented by the Letter Grade system of A, B, C or D as follows:

Letter Grade	Performance Points	Credit	Evaluation Standards
A	80 and above	Credited	Achieved the course aims distinctively
B	70 ~ 79	Credited	Achieved the course aims appropriately
C	60 ~ 69	Credited	Achieved the basic course aims
D	59 and below	Failed	Failed to achieve the course aims

The grade of some courses, however, is represented by the two letters of P or F as follows:

Letter Grade	Credit	Evaluation Standards
P	Credited	Achieved the course aims
F	Failed	Failed to achieve the course aims

### 3-3. Requirements for Graduation

1. To complete the doctoral program, the following requirements must be met.

#### **For Students Who Enroll in 3-year Doctoral Program**

- To be enrolled at the Graduate Institute for Advanced Studies for more than three years (excluding the period of leave of absence)
- To earn at least 16 credits, including 12 credits of Dissertation Work in Advanced Studies IIIA ~VB
- To receive the necessary research guidance and pass the doctoral thesis review and examination
- To make full payment for the tuition fee (excluding students with exemption of the tuition fee)

#### **For Students Who Enroll in 5-year Doctoral Program**

- To be enrolled at the Graduate Institute for Advanced Studies for more than five years (excluding the period of leave of absence)
- To earn at least 42 credits, including 20 credits of Dissertation Work in Advanced Studies IA ~VB
- To receive the necessary research guidance and pass the doctoral thesis review and examination
- To make full payment for the tuition fee (excluding students with exemption of the tuition fee)

#### **For Students Who Enroll in 5-year Doctoral Program and Complete the Doctoral Degree (医学)**

- \* Only those who meet the prescribed requirements and enroll in the Physiological Sciences.
- To be enrolled at the Graduate Institute for Advanced Studies for more than four years (excluding the period of leave of absence)
  - To earn at least 38 credits, including 16 credits of Dissertation Work in Advanced Studies IA~IVB, besides 6 credits among from “Clinical pathophysiology 1,” “Clinical pathophysiology 2,” “Special lectures in clinical medicine,” “Special lectures in oncology,” “Special lectures in social medicine” or “Clinical and Social Medicine Seminar 1,” “Clinical and Social Medicine Seminar 2.”
  - To receive the necessary research guidance and pass the doctoral thesis review and examination
  - To make full payment for the tuition fee (excluding students with exemption of the tuition fee)

\*The requirements for completion of each program apply at the time of enrollment.

2. Students of the Graduate Institute for Advanced Studies may not exceed the enrollment period in the table below (excluding the period of leave of absence).

Doctoral Program	Standard Years	Maximum Years	Leave of Absence
3 years	3 years	5 years	2 years
5 years	5 years ※4 years for 博士 (医学)	8 years	2 years

3. For the details on the classification of the subjects that are attached to the degrees to be awarded, refer to "4-1. Degrees" (on page 29).
4. A student recognized by his / her program as a "student who has accomplished outstanding research performance" may graduate before reaching the required period of the course. For details, contact the Program Office or the Educational Affairs Section, Hayama.

◆ **Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: kyomu@ml.soken.ac.jp)

### **3-4. Studying at Other Universities (in Japan)**

A student may, with the approval of the Dean, Graduate Institute for Advanced Studies, study at another university that has made an academic exchange agreement with SOKENDAI. A certain number of credits can be transferred to SOKENDAI to fulfill part of the requirement for graduation.

A student studying at another university will not be charged to pay registration / tuition fees by that university if there is an exchange agreement with SOKENDAI (excluding expenses for laboratory practice and others).

The table below shows universities that have made exchange agreements with SOKENDAI. For courses available at each university, contact the Program Office or the Educational Affairs Section, Hayama. A student who wishes to study at another university should submit Application for Attending Lectures at Another University (特別聴講派遣学生願) to the Program Office in advance.

◆ **Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: kyomu@ml.soken.ac.jp)

Universities that have made exchange agreements with SOKENDAI (in Japan)

2024. 4. 1

Universities that have consulted exchange agreements with SOKENDAI		Available Program at SOKENDAI																			
		Anthropological Studies	Japanese Studies	Japanese History	Japanese Literature	Japanese Language Sciences	Informatics	Statistical Science	Particle and Nuclear Physics	Accelerator Science	Astronomical Science	Fusion Science	Space and Astronautical Science	Molecular Science	Materials Structure Science	Global Environmental Studies	Polar Science	Basic Biology	Physiological Sciences	Genetics	Integrative Evolutionary Science
Tokyo Institute of Technology		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ochanomizu University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Nagoya University	Medicine																		○	○	○
	Engineering										○	○	○	○				○	○	○	
	Science																	○	○	○	
	Biongricultural Sciences																	○	○	○	
Pharmaceutical Sciences																		○	○	○	
University of Tokyo	Science						○	○	○	○	○	○	○	○	○		○				
	Information Science and Technology							○	○	○	○	○	○	○	○		○	○	○	○	○
International Christian Univer	Arts and Sciences	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kyoto University	Asian and African Area Studies	○																			
Osaka University	Human Sciences	○																			
Kobe University	Cultural Studies and Human Science	○																			
Chiba University	Humanities and Studies on Public Affairs	○	○	○	○																
	Science and Engineering										○	○	○	○							
Japan Advanced Institute of Sc	Advanced Science and Technology						○														
Tsuda College	Science						○	○									○				
Kyushu University	Pharmaceutical Sciences																	○	○	○	
Hosei University	Science and Engineering											○	○	○	○						
Kwansei Gakuin University	Science and Technology												○								
Shizuoka University	Integrated Science and Technology																				
	Medical Photonics																			○	
	Science and Technology, Educational Division																				
Azabu University	Veterinary Science	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Environmental Health																				
Kanagawa University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kanagawa Institute of Technology		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kanto Gakuin University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kitasato University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Shonan Institute of Technology	The Faculty of Engineering	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Economics, Law, Humanities, Business, Administration, Commerce	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Senshu University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tsurumi University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Toin University of Yokohama		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tokai University	Letters, Political Sciences, Economics, Law, Arts, Physical Education, Science, Engineering, Human Environment Studies	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Engineering	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tokyo Polytechnic University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Nihon University	Bioresource Sciences	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Veterinary Medicine	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Yokohama City University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Yokohama National University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Meiji University	Agriculture	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ferris University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Institute of Information Security		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tokyo City University	Environmental and Information Studies	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Sagami Women's University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Shoin University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Aoyama Gakuin University	Science and Engineering	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Bunkyo University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kanagawa Dental University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Kamakura Women's University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
St. Marianna University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Shonan University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Joshibi University		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Den-En Chofu University	Human Welfare	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Yokohama Soei University	Nursing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



### **3-5. Receiving Research Supervision at Other Universities (in Japan)**

A student may, with the approval of the Dean, Graduate Institute for Advanced Studies, receive research supervision at another university that has made an agreement with SOKENDAI.

A student who wishes to receive research supervision at another university should submit “Application for Receiving Supervision at Another University (特別研究派遣学生願)” to the Program Office at least three months before the start of research supervision, after consulting with the main supervisor and a supervisor of the other university. The period of research supervision at another university / research institute is 1 year from the date of approval (an extension of not more than 1 year may be granted when unavoidable circumstances arise).

The “Application for Receiving Supervision at Another University” and the “Report for Receiving Supervision at Another University” can be downloaded from SOKENDAI website.

(<https://www.soken.ac.jp/en/education/curriculum/otheruniv/>).

#### **◆Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1582, e-mail: [kyomu@ml.soken.ac.jp](mailto:kyomu@ml.soken.ac.jp))

### **3-6. International Collaborative Degree Program**

With "advanced specialty and expertise" "broad perspective" and "international competitiveness" as its educational goals, SOKENDAI aims to develop human resources who will be active in the international academic community. In particular, to enhance the international mobility of students, SOKENDAI promotes international collaborative degree programs that take advantage of the rich network of joint research at the parent institutions.

The definition of programs at SOKENDAI are as follows. Please note that designations such as "double degree" and "dual degree" may be used differently in different countries and institutions, and may refer to different systems. Therefore, other designations may be used upon consultation with the partner institution.

#### **1) Double Degree Program**

A graduate student is simultaneously enrolled at SOKENDAI and an overseas institution of higher education and receives joint thesis supervision from two faculty members at each institution with the aim of completing two-degree programs of equivalent level. The purpose of the program is to obtain two degrees with a reduced length of study and amount of study through collaboration through the signing of an agreement.

#### **2) Dual Degree (Cotutelle) Program**

A graduate student is simultaneously enrolled at SOKENDAI and an overseas institution of higher education and receives joint thesis supervision from two faculty members at each institution. The thesis research is conducted under the supervision of two formal supervisors based on a framework agreement between the institutions and an individual agreement for each student. A single degree is awarded to students who have met the requirements for completion of the doctoral program after single joint thesis defense. However, diplomas are issued at each institution (1 degree, 2 diplomas).

### 3) Joint Supervision Program

A graduate student receives joint thesis supervision from two faculty members, one from SOKENDAI and the other from an overseas institution of higher education. The student is registered only at his / her home institution and is a non-degree student at the other institution but conducts the thesis research under the supervision of two formal supervisors based on a framework agreement between the institutions and an individual agreement for each student. A single degree is awarded to students who have met the requirement of their home institution, after the thesis defense conducted by their home institution. In addition, a jointly named certificate will be issued, certifying that the thesis research was jointly supervised by the two institutions.

If you are interested in international collaborative degree program with an overseas university (not limited to those listed below), please contact the General Planning Division (cotutelle@ml.soken.ac.jp) after consultation with your academic advisor.

[Reference] List of institutions that have signed agreements with SOKENDAI

Institution	Nation	Type of Program		
		Double Degree	Dual Degree (Cotutelle)	Joint Supervision
Southwest Jiaotong University	China			○
Vidyasirimedhi Institute of Science and Technology	Thailand	○		
École Centrale de Nantes	France		○	
Université Paris-Saclay	France		○	
Sorbonne Université	France		○	
Georgian Technical University	Georgia	○		
Università di Bologna	Italy		○	

#### ◆ Contact

Student Support Services Planning Section (e-mail: cotutelle@ml.soken.ac.jp)

### 3-7. Other

#### ● Travel Expenses for Students

When a SOKENDAI student travels to the Hayama Campus or the location of other programs for the purpose of "receiving a lecture or research supervision," and incurs travel expenses, part of these expenses may be reimbursed as travel expenses for a student.

The student should contact in advance to the Program Office to learn the requirements for reimbursement.

For details, please refer to the following website.

([https://www.soken.ac.jp/en/education/dispatch/trv\\_supp/](https://www.soken.ac.jp/en/education/dispatch/trv_supp/))

#### ● Long-term course system (*choki rishu seido*)

Long-term course system is a planned course of study for a certain period of time beyond the

standard period of study upon request from the student, who has an occupation or other circumstances. Please inquire the Program Office at each Parent Institute to apply for the Long-term course system.

◆**Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: kyomu@ml.soken.ac.jp)

● **Make an Objection to the Course Grades**

A student may make an objection to the grades for the enrolled courses, only if the case falls under any of the following (1) - (3):

- (1) Transcriptional errors or other errors were likely made by the teacher of the course.
- (2) Evaluation was not likely done by the methods indicated in the course syllabus, or known through classes or other occasions.
- (3) Reasonable and objective grounds can support the student's claim.

A student who wishes to make an objection to the grades should submit "Objection on Grade Evaluation" to the Program Office. The application must be received by October 15th for the grades of the first semester, and by April 15th for those of the second semester (should the dates are not on an office day, such as during weekends or on national holidays, the deadline will be the next following office day).

◆**Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: kyomu@ml.soken.ac.jp)

## 4. Degrees (*gakui*)

### 4-1. Degrees

1. A doctoral degree is granted by SOKENDAI if a student: (1) has been in Graduate Institute for Advanced Studies for specified number of years or more, has acquired the required number of credits or more, has received the required supervision, and then passed the doctoral thesis review and examinations (Doctor [Katei-Hakase]) or (2) has applied for review and examination of his / her doctoral thesis without being in Graduate Institute for Advanced Studies and has passed the review and examination (Doctor by Dissertation [Ronbun-Hakase]). Enrolled students should aim to obtain a doctoral degree by the first method (1) (Doctor [Katei-Hakase]).

Program	Degree
Anthropological Studies	Doctor of Philosophy
Japanese Studies	
Japanese History	
Japanese Literature	
Japanese Language Sciences	
Informatics	
Statistical Science	
particle and Nuclear Physics	
Accelerator Science	
Astronomical Science	
Fusion Science	
Space and Astronautical Science	
Molecular Science	
Materials Structure Science	
Global Environmental Studies	
Polar Science	
Basic Biology	
Physiological Sciences	
Genetics	
Integrative Evolutionary Science	

### 2. Master's degree

SOKENDAI does not offer any master's program; therefore, in principle, no master's degree is awarded. However, a student who is registered in the 5-year doctoral program in Graduate Institute for Advanced Studies, and has been permitted to withdraw from SOKENDAI and has satisfied all of the requirements below may be awarded a master's degree. Master's degree will not be awarded after withdrawal.

- Enrollment in SOKENDAI for two years or more
- Earned at least 30 credits as prescribed
- Having undergone the necessary research supervision, successful examination of a master's thesis or specific research project and successful completion of the final examination

For information on degree examinations and procedures, contact the Program Office or the Educational Affairs Section, Hayama. Those who withdrew from the university with Master's Degree (*shushi*) will not be eligible to earn Doctor's degree (Katei-Hakase) from SOKENDAI in any case after withdrawal. Should you have any questions, please contact Educational Affairs Section.

#### 4-2. Examination of Doctoral Thesis

The examination of doctoral thesis is conducted every semester in each program. The programs have different examination procedures; however, SOKENDAI conducts a basic scheme of 2-staged examination, which consists of preliminary and final examinations.

The date of doctoral thesis examination is decided by each program. A student must complete the appropriate application process within the application period established by each program.

The application procedure / form for each program in Graduate Institute for Advanced Studies can be downloaded from SOKENDAI website.

(<https://www.soken.ac.jp/en/education/degree/>)

The flow of the examination is outlined below.

◎The process of doctoral thesis examination (steps with circled numbers are to be completed by a student)

- ① Application for Preliminary Examination (Some programs have a different name for the preliminary examination.)

The application is accepted by the deadline set by each program.

↓

- Examination by the Preliminary Examination Committee

The preliminary examination is conducted on the date set by each program.

↓

- ② Application for Final Examination

The application is accepted within the application period set by each program.

↓

- Examination by the Final Examination Committee

The final examination is conducted on the date set by each program within three months of application acceptance.

↓

- Report of the Examination Result by the Final Examination Committee

↓

- Discussion and Approval by the Program Committee

↓

- Discussion and Approval at the Faculty Meeting

Resolution on Conferral of Doctoral Degree

↓

- ③ Submission of the Registration Request Form (from a student to the Program Office)

↓

④ Graduation Ceremony (Conferral of degrees)



- Publication of theses and dissertations via the Internet

#### 4-3. Publication of Doctoral Thesis

A doctoral thesis, summary (abstract) of doctoral thesis contents and summary of the results of the doctoral thesis screening will be published on the Internet.

SOKENDAI Repository <https://ir.soken.ac.jp/>

\* You can see SOKENDAI bulletin and doctoral thesis.

#### Important Notes

——When submitting a paper (the content of your doctoral thesis) to a scientific journal——

SOKENDAI Library has no specific guidelines for submitting a paper (the content of your doctoral thesis) to a scientific journal. Your supervisor may know much about this matter.

For your reference, please check the following Key points.

[Key points]

- ◆ Please confirm the terms and conditions of the journal publisher.  
Terms and conditions depend on the policy of each publisher.  
The publisher may reject the paper, which is already open to the public.  
The publisher may allow you to publish your paper as a doctoral thesis but may not let you put it on the site (ex. institutional repository).  
(You may need to postpone the repository publication.)
- ◆ You should ask your supervisor before posting your paper.  
When you need to fill in the paper "Reason in Writing for the Publication of an Abridged Version (Outline) instead of the Full-text," you need your supervisor's authorization.
- ◆ To prevent "duplicate submission" trouble with the publisher, please be careful.
- ◆ If you publish your doctoral thesis by the book publisher, please check the contract satisfactorily.  
Please ask your supervisor and the publisher before publication if you have any questions.

#### ◆Contact

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: [kyomu@ml.soken.ac.jp](mailto:kyomu@ml.soken.ac.jp))  
Library, Hayama (Tel: 046-858-1540, e-mail: [lib@ml.soken.ac.jp](mailto:lib@ml.soken.ac.jp))

## 5. Other

### 5-1. Non-Regular Student

#### **【 Auditing Student with Credit, Auditing Student, Special Auditing Student, Research Student, Special Research Student 】**

Non-Regular Student refers to students other than those who register in the doctoral program of Graduate Institute for Advanced Studies. SOKENDAI recognizes five categories of Non-Regular Student: Auditing Student with Credits, Auditing Student, Special Auditing Student, Research Student, and Special Research Student.

- Auditing Student with Credits

A student taking classes and acquiring credits at SOKENDAI

- Auditing Student

A student auditing classes at SOKENDAI without any credits

- Special Auditing Student

A student of other university who takes classes and acquires credits at SOKENDAI under the agreement between the university and SOKENDAI

- Research Students

A student conducting research activities on specific themes at SOKENDAI

- Special Research Students

A student of other university who conducts research activities and receives supervision at SOKENDAI under the agreement between the university and SOKENDAI

- **Tuition fee for Non-Regular Students**

A Non-Regular Student must pay the tuition fee listed below. The payment date will be informed accordingly. Special Auditing Student and Special Research Student may be exempted from tuition fee if SOKENDAI and the student's university have mutually agreed that no tuition fee is required under an agreement or with a preliminary arrangement between SOKENDAI and the university (the costs and expenses for laboratory practice will be borne by a student).

Tuition exemption / postponement is not available to Non-Regular Students.

Category	Tuition Fee 2024
Auditing Student with Credits	14,800 yen per credit
Auditing Student	14,800 yen per class equivalent to a credit
Special Auditing Student	14,800 yen per class equivalent to a credit
Research Student	29,700 yen per month
Special Research Students	29,700 yen per month

- **Withdrawal, Punishment, and Removal from Register of Non-Regular Student**

The rules for regular student will apply.

- **Issuance of Certificates for Non-Regular Students**

The rules for regular student will apply. However, Certificate of Enrollment is issued only for regular students. If a non-regular student needs a certificate of being registered at SOKENDAI, please request for Certificate of Enrollment Period (在籍期間証明書).

- **Research Period for Research Students / Special Students**

Research Student and Special Research Student may conduct research for one year from the date of admission. If such student wishes to continue research activities at SOKENDAI after the end of the initial research period, the research period may be extended at the discretion of the President.

- ◆ **Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1582/1524, e-mail: kyomu@ml.soken.ac.jp)

## **5-2. Rules for Handling the Names of Students in SOKENDAI**

In principle, SOKENDAI uses the name of each student according to family register. Upon request, however, the use of his / her former name, or the use of the name on family register along with his / her former name can be accepted. Once the use of such notations is approved, the former name, or the name on family register along with the former name will appear on all certificates / documents issued by SOKENDAI.

- ◆ **Contact**

Educational Affairs Section, Hayama (Tel: 046-858-1524/1582, e-mail: kyomu@ml.soken.ac.jp)

## **5-3. Managing Your Academic Identity with ORCID**

ORCID provides researchers with a unique identifier (an ORCID iD) plus a mechanism for linking their research outputs and activities to their ORCID iD. SOKENDAI is encouraging all students to register for ORCID. Approximately one month and a half after your enrollment, an email requesting you to "Please verify your ORCID account and grant us permission" will be sent to all new students. Then, please register for ORCID iD following the instructions of the email.

For more information, please refer to the web page, "Managing Your Academic Identity with ORCID" < <https://www.soken.ac.jp/en/campuslife/orcid/> >.

- ◆ **Contact**

General Planning Division  
(e-mail: [orcid@ml.soken.ac.jp](mailto:orcid@ml.soken.ac.jp))



## **5-4. Rules for Writing the Names of the University etc.**

- **Name of the University**

An official name of the University is 'The Graduate University for Advanced Studies, SOKENDAI'.

If it's necessary to omit 'The Graduate University for Advanced Studies' or 'SOKENDAI', or if the omission does not cause problems, 'SOKENDAI' is the first option, and the second option is 'The Graduate University for Advanced Studies'.

If it is necessary to emphasise that it is a national university, it can be spelled as

'National University Corporation  
The Graduate University for Advanced Studies, SOKENDAI'



● **Name of the Institute**

If you need to denote with the name of the institute, it can be spelled as  
`Graduate Institute for Advanced Studies, SOKENDAI`.

● **Name of the Department**

The department can be spelled as `Department of Advanced Studies`.

● **Name of the Programs**

Anthropological Studies	人類文化研究コース
Japanese Studies	国際日本研究コース
Japanese History	日本歴史研究コース
Japanese Literature	日本文学研究コース
Japanese Language Sciences	日本語言語科学コース
Informatics	情報学コース
Statistical Science	統計科学コース
Particle and Nuclear Physics	素粒子原子核コース
Accelerator Science	加速器科学コース
Astronomical Science	天文科学コース
Fusion Science	核融合科学コース
Space and Astronautical Science	宇宙科学コース
Molecular Science	分子科学コース
Materials Structure Science	物質構造科学コース
Global Environmental Studies	総合地球環境学コース
Polar Science	極域科学コース
Basic Biology	基礎生物学コース
Physiological Sciences	生理科学コース
Genetics	遺伝学コース
Integrative Evolutionary Science	統合進化科学コース

\*They also can be spelled with `the Graduate Institute for Advanced Studies, SOKENDAI`

Anthropological Studies, Graduate Institute for Advanced Studies, SOKENDAI 人類文化研究コース  
Japanese Studies, Graduate Institute for Advanced Studies, SOKENDAI 国際日本研究コース  
Japanese History, Graduate Institute for Advanced Studies, SOKENDAI 日本歴史研究コース  
Japanese Literature Program, Graduate Institute for Advanced Studies, SOKENDAI 日本文学研究コース  
Japanese Language Sciences, Graduate Institute for Advanced Studies, SOKENDAI 日本語言語科学コース  
Informatics Program, Graduate Institute for Advanced Studies, SOKENDAI 情報学コース  
Statistical Science Program, Graduate Institute for Advanced Studies, SOKENDAI 統計科学コース  
Particle and Nuclear Physics Program, Graduate Institute for Advanced Studies, SOKENDAI 素粒子原子核コース  
Accelerator Science Program, Graduate Institute for Advanced Studies, SOKENDAI 加速器科学コース  
Astronomical Science Program, Graduate Institute for Advanced Studies, SOKENDAI 天文科学コース  
Fusion Science Program, Graduate Institute for Advanced Studies, SOKENDAI 核融合科学コース

Space and Astronautical Science, Graduate Institute for Advanced Studies, SOKENDAI 宇宙科学コース  
Molecular Science Program, Graduate Institute for Advanced Studies, SOKENDAI 分子科学コース  
Materials Structure Science Program, Graduate Institute for Advanced Studies, SOKENDAI 物質構造科学コース  
Global Environmental Studies, Graduate Institute for Advanced Studies, SOKENDAI 総合地球環境学コース  
Polar Science Program, Graduate Institute for Advanced Studies, SOKENDAI 極域科学コース  
Basic Biology Program, Graduate Institute for Advanced Studies, SOKENDAI 基礎生物学コース  
Physiological Sciences Program, Graduate Institute for Advanced Studies, SOKENDAI 生理科学コース  
Genetics Program, Graduate Institute for Advanced Studies, SOKENDAI 遺伝学コース  
Integrative Evolutionary Science, Graduate Institute for Advanced Studies, SOKENDAI 統合進化科学コース

(Previous Courses) \*Students enrolled in / before the 2022 academic year

● **Names of the Schools**

- School of Cultural and Social Studies 文化科学研究科
- School of Physical Sciences 物理科学研究科
- School of High Energy Accelerator Science 高エネルギー加速器科学研究科
- School of Multidisciplinary Sciences 複合科学研究科
- School of Life Science 生命科学研究科
- School of Advanced Sciences 先端科学研究科

● **Names of the Departments**

- School of Cultural and Social Studies 文化科学研究科
  - Department of Regional Studies 地域文化学専攻
  - Department of Comparative Studies 比較文化学専攻
  - Department of Japanese Studies 国際日本研究専攻
  - Department of Japanese History 日本歴史研究専攻
  - Department of Japanese Literature 日本文学研究専攻
- School of Physical Sciences 物理科学研究科
  - Department of Structural Molecular Science 構造分子科学専攻
  - Department of Functional Molecular Science 機能分子科学専攻
  - Department of Astronomical Science 天文科学専攻
  - Department of Fusion Science 核融合科学専攻
  - Department of Space and Astronautical Science 宇宙科学専攻
- School of High Energy Accelerator Science 高エネルギー加速器科学研究科
  - Department of Accelerator Science 加速器科学専攻
  - Department of Materials Structure Science 物質構造科学専攻
  - Department of Particle and Nuclear Physics 素粒子原子核専攻

- School of Multidisciplinary Sciences 複合科学研究科
  - Department of Statistical Science 統計科学専攻
  - Department of Polar Science 極域科学専攻
  - Department of Informatics 情報学専攻
  
- School of Life Science 生命科学研究科
  - Department of Genetics 遺伝学専攻
  - Department of Basic Biology 基礎生物学専攻
  - Department of Physiological Sciences 生理科学専攻
  
- School of Advanced Sciences 先導科学研究科
  - Department of Evolutionary Studies of Biosystems 生命共生体進化学専攻

● Dissertation

- ① For your dissertation, it has to be applied with 'Graduate Institute for Advanced Studies, SOKENDAI' as affiliation.
- ② It can be used both 'Shonan Village, Hayama, Kanagawa 240-0193, Japan' or each institution's location for the address of the Graduate Institute for Advanced Studies, SOKENDAI.

## 5-5. Contacts

- Contact list of the Hayama Headquarters of SOKENDAI (As of April 2024)

Item	Charge Post
<p>The Graduate University for Advanced Studies, SOKENDAI Administration Office, Library, The Center for Education Planning and Development Shonan Village, Hayama, Kanagawa, 240-0193 Japan</p>	
Change in Registration Status (absence from school, withdrawal, etc.)	<p>Educational Affairs Section (Kyomu-gakari) Tel: 046-858-1524/1582 e-mail: kyomu@ml.soken.ac.jp</p>
Course Registration /Academic Transcript (including course registration at another university)	
Degree	
Issuance of Certificates	
Teaching Certificate	
Counseling Services for Students	<p>Student Affairs Section (Gakusei-gakari) Tel: 046-858-1525/1526/1527 e-mail: gakusei@ml.soken.ac.jp</p>
Tuition Exemption	
Welfare Guidance	
Extracurricular Activities	
Japan Student Services Organization (JASSO) Scholarships	
Awards	
Student ID Card	
International Students (application for visas, issuance of Certificates of Japanese Government [Monbukagakusho] Scholarship Student, and other supports)	
Tuition Payment and Reminder	<p>Accounting Section (Keiri-gakari) Tel: 046-858-1514 e-mail: keiri1@ml.soken.ac.jp</p>
Registration of / Change in the Bank Account for Tuition Payment	
Postdoctoral Fellowship of Japan Society for Promotion of Science (JSPS)	<p>Research Coordination Section (Kenkyukyoryoku-gakari) Tel: 046-858-1608 e-mail: kenkyo@ml.soken.ac.jp</p>
Research Grants	
Intellectual Property Rights	
Library (Electronic journals, SOKENDAI Repository, SOKENDAI Archival Information Database, and Other References)	<p>Library Tel: 046-858-1540 e-mail: lib@ml.soken.ac.jp</p>

●Program Office of the Parent Institute (As of April 2024)

Program	Contact
Anthropological Studies	Kokuritsu Minzokugaku Hakubutsukan (National Museum of Ethnology) 10-1 Senri Expo Park, Suita, Osaka, 565-8511 Japan Tel: 06-6878-8236 e-mail: souken@minpaku.ac.jp
Japanese Studies	Kokusai Nihon Bunka Kenkyu Senta (International Research Center for Japanese Studies, Research Support Unit, Research Cooperation Section) 3-2, Oeyama-cho, Goryo, Nishikyo-ku, Kyoto, 610-1192 Japan Tel: 075-335-2052 e-mail: senkou@nichibun.ac.jp
Japanese History	Kokuritsu Rekishi Minzoku Hakubutsukan (National Museum of Japanese History) 117 Jonai-cho, Sakura, Chiba, 285-8502 Japan Tel: 043-486-4361 e-mail: soken@ml.rekihaku.ac.jp
Japanese Literature	Kokubungaku Kenkyu Shiryokan (National Institute of Japanese Literature) Research Cooperation and Education Support Section 10-3, Midori-cho, Tachikawa, Tokyo, 190-0014 Japan Tel: 050-5533-2915 e-mail: edu-ml1@nijl.ac.jp
Japanese Language Sciences	Kokuritsu Kokugo Kenkyusho (National Institute for Japanese Language and Linguistics) Research Promotion Division 10-2 Midoricho, Tachikawa City, Tokyo, 190-8561 Tel:042-540-4374 e-mail: gs-edu@ninjal.ac.jp
Informatics	Kokuritsu Johogaku Kenkyusho (National Institute of Informatics) Int'l Affairs and Education Support Team 2-1-2, Hitotsubashi, Chiyoda-ku, Tokyo, 101-8430 Japan Tel: 03-4212-2110 e-mail: daigakuin@nii.ac.jp
Statistical Science	Tokei Suri Kenkyujo (The Institute of Statistical Mathematics) 10-3, Midori-cho, Tachikawa, Tokyo, 190-8562 Japan Tel: 050-5533-8514 e-mail: sokendai@list.ism.ac.jp
Particle and Nuclear Physics Accelerator Science Materials Structure Science	Ko-Enerugi Kasokuki Kenkyu Kiko (High Energy Accelerator Research Organization) 1-1 Oho, Tsukuba, Ibaraki, 305-0801 Japan Tel: 029-864-5128 e-mail: kyodo2@mail.kek.jp
Astronomical Science	Kokuritsu Tenmondai (National Astronomical Observatory of Japan) 2-21-1, Osawa, Mitaka, Tokyo, 181-8588 Japan Tel: 0422-34-3659 e-mail: daigakuin@nao.ac.jp
Fusion Science	Kakuyugo Kagaku Kenkyusho (National Institute for Fusion Science) Graduate Student Affairs Section 322-6, Oroshi-cho, Toki, Gifu, 509-5292 Japan Tel: 0572-58-2042 e-mail: daigakuin@nifs.ac.jp

<b>Program</b>	<b>Contact</b>
Space and Astronautical Science	Uchu Kagaku Kenkyujo (Institute of Space and Astronautical Science) 3-1-1, Yoshinodai, Chuo-ku, Sagamihara, Kanagawa, 252-5210 Japan Tel: 042-759-8012 e-mail: sokendai@ml.jaxa.jp
Molecular Science Basic Biology Physiological Sciences	Bunshi Kagaku Kenkyusho (Institute for Molecular Science) Kiso Seibutsugaku Kenkyusho (National Institute for Basic Biology) Seirigaku Kenkyusho (National Institute for Physiological Sciences) 38 Nishigonaka, Myodaiji, Okazaki, Aichi, 444-8585 Japan Tel: 0564-55-7139 e-mail: r7139@orion.ac.jp
Global Environmental Studies	Sogo Chikyukankyogaku Kenkyusho (Research Institute for Humanity and Nature) 457-4 Kamigamo, Motoyama, Kita-ku, Kyoto, 603-8047 JAPAN Tel: 075-707-2152 e-mail: gakumu@chikyu.ac.jp
Polar Science	Kokuritsu Kyokuchi Kenkyusho (National Institute of Polar Research) 10-3, Midori-cho, Tachikawa, Tokyo, 190-8518 Japan Tel: 042-512-0612 e-mail: sokendai-kyokuiki@nipr.ac.jp
Genetics	Kokuritsu Idengaku Kenkyusho (National Institute of Genetics) Academic Services Division, General Affairs and Project Section, Department of Administration 1111 Yata, Mishima, Shizuoka, 411-8540 Japan Tel: 055-981-6720 e-mail: info-soken@nig.ac.jp
Integrative Evolutionary Science	Hayama Campus (Hayama Headquarter) School of Advanced Sciences (RCIES Administrative Section) Shonan Village, Kanagawa, 240-0193 Japan Tel: 046-858-1577 e-mail: hayamajimu@ml.soken.ac.jp

## 6 . Outlines of Courses Provided by Program

Graduate Institute for Advanced Studies . . . . .	40
Anthropological Studies . . . . .	44
Japanese Studies . . . . .	45
Japanese History . . . . .	48
Japanese Literature . . . . .	50
Japanese Language Sciences . . . . .	55
Informatics . . . . .	56
Statistical Science . . . . .	63
Particle and Nuclear Physics . . . . .	75
Accelerator Science . . . . .	80
Astronomical Science . . . . .	86
Fusion Science . . . . .	90
Space and Astronautical Science . . . . .	96
Molecular Science . . . . .	104
Materials Structure Science . . . . .	112
Global Environmental Studies . . . . .	114
Polar Science . . . . .	116
Basic Biology . . . . .	124
Physiological Sciences . . . . .	132
Genetics . . . . .	140
Integrative Evolutionary Science . . . . .	152
Others . . . . .	158
Course Code . . . . .	159

## Dissertation Work in Advanced Studies

Course Code	Course	Credit	Content of Subject
80GAS001**	Dissertation Work in Advanced Studies I A	2	Students will work with the chief supervisor to set their own research topics, investigate the academic background of the topic, and gain an understanding of the relevant basic academic theories. Students will begin initial investigations on actual research projects and acquire the basic methods necessary to carry out their research.
80GAS002**	Dissertation Work in Advanced Studies I B	2	Students will work with the chief supervisor to set their own research topics, investigate the academic background of the topic, and gain an understanding of the relevant basic academic theories. Students will begin initial investigations on While conducting a basic study of the issue, students will organize the research problems to be solved and, through discussions with their supervisors, formulate a medium-term research plan and work on its solution. Students will learn appropriate research methodologies (e.g., how to organize and interpret data, how to expand, select, and focus research topics, etc.) in order to solve problems.
80GAS003**	Dissertation Work in Advanced Studies II A	2	Students will focus on selecting and concentrating on their own research topics according to the progress of their own research projects. Through repeated discussions with their supervisors, students will review their research topics and revise their research plans as necessary to deepen their research in a flexible and rational manner. In addition, students will understand the relationship between the research topic and the surrounding areas.
80GAS004**	Dissertation Work in Advanced Studies II B	2	Students will improve the generality, depth, and accuracy of the results and data obtained in their research projects to a high-quality level that will contribute to objective evaluation. Students will organize their understanding of the research topic and the results of their research up to this point.



## Dissertation Work in Advanced Studies

Course Code	Course	Credit	Content of Subject
80GAS005**	Dissertation Work in Advanced Studies Ⅲ A	2	<p><b>【5-year doctoral program】</b> Establish a more academically advanced doctoral degree research project based on the initial two years of work on the research project. If necessary, the assignment will be re-established or the research direction will be substantially revised. Students will develop their own research plan and promote research on their own initiative in response to the established research topics.</p> <p><b>【3-year doctoral program】</b> Students will set a doctoral research theme in collaboration with their supervisors while making use of their own academic background, and then investigate the academic background in the research area of the theme and understand the related theories that form the basis of the theme. Students will begin initial consideration of the actual research topic, and after confirming the knowledge and skills they need to acquire, such as the research methods and language required to carry out the research, they will formulate a specific course plan and begin implementation of the plan.</p>
80GAS006**	Dissertation Work in Advanced Studies Ⅲ B	2	<p><b>【5-year doctoral program】</b> Concentrate on their research projects and reach a level of achievement that is fully evaluated in light of international standards. Then, they will extend or deepen their own research topics and advance to more advanced research. In cases where progress is not being made according to the research plan, the student will rationally sort out the problem and find a way to resolve it.</p> <p><b>【3-year doctoral program】</b> The research theme will be further extended or deepened to establish a doctoral degree research theme at a level that is fully evaluated in light of international standards in related academic fields. Students will independently create a research plan and carry out necessary preparations for the research project.</p>

## Dissertation Work in Advanced Studies

Course Code	Course	Credit	Content of Subject
80GAS007**	Dissertation Work in Advanced Studies IVA	2	<p>【5-year doctoral program】 Concentrate on research projects. In this course, students are expected to publish their research results in international academic papers or at international conferences and symposiums to obtain objective evaluations from the surrounding academic fields. Depending on the progress and development of the research project, students will collaborate with external (domestic and international) related research teams and participate in research as interns on their own initiative.</p> <p>【3-year doctoral program】 Concentrate on the research subject that he/she has set for himself/herself based on the methodology of the relevant academic field. Then, if necessary, reassign the issue or review the research direction. If progress is not made according to the research plan, students will rationally sort out the problem and set a course for solving the problem.</p>
80GAS008**	Dissertation Work in Advanced Studies IVB	2	<p>【5-year doctoral program】 Accumulate results toward obtaining a doctoral degree, objectively self-evaluate their overall significance, explore unexplored research issues, and take on the challenge of leading such research. Or, they will compile the results they have accumulated and present their findings within a larger framework (e.g., a synthesis paper or a synthesis lecture).</p> <p>【3-year doctoral program】 By presenting the accumulated results in exercises, etc., the program aims to develop multifaceted and original discussions. In addition, students will be able to conceptualize the entirety of their doctoral degree research and understand the academic significance of their research results in the surrounding fields and society.</p>

## Dissertation Work in Advanced Studies

Course Code	Course	Credit	Content of Subject
80GAS009**	Dissertation Work in Advanced Studies V A	2	<p>【5-year doctoral program】 Understand the new value that the research results accumulated up to this point bring to their own research field, and promote further leading and advanced research that contributes to the improvement of that field. In addition, to gain a bird's-eye view of doctoral degree research and understand the academic significance of their research results in the surrounding fields and society.</p> <p>【3-year doctoral program】 Understand the new value that the research results accumulated up to this point bring to their own research field, and promote further leading and advanced research that contributes to the improvement of that field. In this course, students are expected to present the results of their research in academic papers, joint research meetings, symposiums, and conferences in their own research fields, and to obtain objective evaluations from surrounding academic fields.</p>
80GAS010**	Dissertation Work in Advanced Studies V B	2	<p>【5-year doctoral program】 Concentrate on the preparation of the doctoral dissertation, organizing the data necessary for the dissertation and conducting research in the literature. In addition, students will work on acquiring research data to support their dissertation. In the writing of the dissertation, students will learn logical writing techniques and academic ethics in the writing of the dissertation. Students will also acquire good presentation skills as needed.</p> <p>【3-year doctoral program】 Concentrate on the preparation of the doctoral dissertation, organizing the data necessary for the dissertation and conducting research in the literature. In addition, students will work on acquiring research data to support their dissertation. In the writing of the dissertation, students will learn logical writing techniques and academic ethics in the writing of the dissertation. Students will also acquire good presentation skills as needed.</p>

## Anthropological Studies

Course Code	Course	Credit	Content of Subject
40ANS001**	Foundation of Anthropology 1	2	This course aims to provide a basic understanding of the issues, ideas and methodology of social anthropology through lectures and discussions on the research subjects and areas of social anthropology, fieldwork as a research method, and ethnography as a research outcome.
40ANS002**	Foundation of Anthropology 2	2	Basic theories, methods, and key findings in various fields (physical anthropology, archaeology, primatology, ethnography, etc.) will be reviewed to comprehensively understand human culture.
40ANS003**	Preservation of Museum Objects	1	Collection management and museum environment
40ANS004**	Theory and Practice of Audiovisual Storytelling	1	Aquiring the basic knowledge of audiovisual storytelling trough hands on practices.
40ANS005**	Lecture on Anthropology 1	2	Gender and Medical Anthropology
40ANS006**	Lecture on Anthropology 2	2	Cultural Heritage Studies
80ANS001**	Proseminar 1	2	Proseminar on Anthropological Studies
80ANS002**	Proseminar 2	2	Proseminar on Anthropological Studies
80ANS003**	Dissertation Seminar 1	2	Seminar for Thesis Writing
80ANS004**	Dissertation Seminar 2	2	Seminar for Thesis Writing

## Japanese Studies

Course Code	Course	Credit	Content of Subject
40JST001**	Theory and Methodology in Japanese Studies A	1	<ul style="list-style-type: none"> <li>• The objective of the lectures is to clarify the theoretical and methodological frameworks that form the basis of Japanese studies, and to gain knowledge and a common understanding about the various academic fields that fall under the category of Japanese studies. This will be achieved through an exploration of the latest trends, cutting-edge themes, theories, methods, etc., in each faculty member's field of study, and through a multifaceted approach from the following perspectives.</li> <li>• The objective is for learners to acquire, through these lectures, the ability to relativize the framework of Japanese studies itself and construct a methodology that will lead to the creation of new Japanese studies.</li> <li>• The ultimate goal of the program is to foster researchers who can play a role in the internationalization of Japanese studies through the above educational effects.</li> </ul>
40JST002**	Theory and Methodology in Japanese Studies B	1	<ul style="list-style-type: none"> <li>• The objective of the lectures is to clarify the theoretical and methodological frameworks that form the basis of Japanese studies, and to gain knowledge and a common understanding about the various academic fields that fall under the category of Japanese studies. This will be achieved through an exploration of the latest trends, cutting-edge themes, theories, methods, etc., in each faculty member's field of study, and through a multifaceted approach from the following perspectives.</li> <li>• The objective is for learners to acquire, through these lectures, the ability to relativize the framework of Japanese studies itself and construct a methodology that will lead to the creation of new Japanese studies.</li> <li>• The ultimate goal of the program is to foster researchers who can play a role in the internationalization of Japanese studies through the above educational effects.</li> </ul>
40JST003**	Practical Training in Symposium Management A	1	<ul style="list-style-type: none"> <li>• Participants will be involved in the planning and operation of symposia, seminars, international research meetings, joint research meetings, etc., planned by the International Research Center for Japanese Studies, the host institution of this course, and will acquire the necessary experience through hands-on practice in the management methods used in holding symposia, etc., from the following perspectives.</li> <li>1. Seminar “Preparing for symposia or other similar research events”</li> <li>2. Seminar “Practical reporting at symposia or other similar research events”</li> <li>3. Seminar “Participating in discussions at symposia or other similar research events”</li> <li>• The program will help participants to acquire the necessary know-how for planning themes, preparing programs, negotiating with presenters, etc., including communication in foreign languages, and securing interpreters for symposia and other similar events.</li> <li>• Therefore, the objective is for the participant to accumulate sufficient experience to organize symposia, etc., as a researcher in the future by being involved in such work at the site where symposia and similar events are organized.</li> <li>• The ultimate goal of the program is to foster researchers with the ability to engage in international and interdisciplinary communication, through the above educational effects.</li> <li>• Faculty in charge: All faculty members</li> <li>• Dates of the symposium: Depends on the plans of the faculty members involved in the selected symposium, etc.</li> </ul>

## Japanese Studies

Course Code	Course	Credit	Content of Subject
40JST004**	Practical Training in Symposium Management B	1	<ul style="list-style-type: none"> <li>Participants will be involved in the planning and operation of symposia, seminars, international research meetings, joint research meetings, etc., planned by the International Research Center for Japanese Studies, the host institution of this course, and will acquire the necessary experience through hands-on practice in the management methods used in holding symposia, etc., from the following perspectives.</li> <li>1. Seminar “Forming networks at symposia or other similar research events”</li> <li>2. Seminar “Having wrap-up sessions at symposia or other similar research events.”</li> <li>3. Seminar “Internalizing the outcomes of symposia or other similar events into individual research”</li> <li>The program will help participants to acquire the necessary know-how for planning themes, preparing programs, negotiating with presenters, etc., including communication in foreign languages, and securing interpreters for symposia and other similar events.</li> <li>Therefore, the objective is for the participant to accumulate sufficient experience to organize symposia, etc., as a researcher in the future by being involved in such work at the site where symposia and similar events are organized.</li> <li>The ultimate goal of the program is to foster researchers with the ability to engage in international and interdisciplinary communication, through the above educational effects.</li> <li>Faculty in charge: All faculty members</li> <li>Dates of the symposium: Depends on the plans of the faculty members involved in the selected symposium, etc.</li> </ul>
80JST001**	Interdisciplinary Research III A	1	This course develops academic writing. In consultation with their supervisors, candidates will review the literature and research fundamental theoretical knowledge necessary for their doctoral projects. The course demands oral presentations and discussions on this material, and will focus on developing the ability to write a doctoral dissertation.
80JST002**	Interdisciplinary Research III B	1	<ul style="list-style-type: none"> <li>This course will help students to begin writing an interdisciplinary dissertation in Japanese Studies. It will enable them to develop their research topics, create their own independent research plans, conduct their own research, and practice both oral presentations and Q&amp;A sessions on their findings.</li> </ul>
80JST003**	Interdisciplinary Research IV A	1	<ul style="list-style-type: none"> <li>This course will help students write their interdisciplinary dissertations. It will aid students in developing an appropriate methodology, conducting both literature reviews and intensive field research, and practicing both presentations and Q&amp;A sessions on their research results. The course will cultivate an interdisciplinary perspective by answering questions from faculty members belonging to various specialized fields. Research progress sessions will provide targeted guidance to students to enable them to write their dissertations.</li> </ul>
80JST004**	Interdisciplinary Research IV B	1	<ul style="list-style-type: none"> <li>This course will aid dissertation writing by helping students to organize and analyze original texts, primary sources, and data; to practice oral presentations and Q&amp;A sessions based on the results; and to engage in multifaceted and original discussions with faculty members. In addition, by orally presenting their research in progress, students will develop the skills necessary to organize and present their research results, and demonstrate the significance of their research results to related academic fields and to society more broadly.</li> </ul>

## Japanese Studies

Course Code	Course	Credit	Content of Subject
80JST005**	Interdisciplinary Research V A	1	This course supports the writing of an interdisciplinary thesis. Students will review research which has contributed to the formation of the field, reflect upon ways in which the field could be pushed forward, and pushed to make their own contributions. Students will have opportunities to present their in-progress research at joint research meetings and conferences, and respond to critiques from faculty members in various fields. This will allow students to develop an interdisciplinary perspective, the ability to accurately communicate their research findings, and ultimately to successfully engage in international and interdisciplinary discussions in the Japanese studies field.
80JST006**	Interdisciplinary Research V B	1	This course will help students complete their dissertations. Students will organize the research literature necessary for their dissertations, acquire data to support their findings, and defend their conclusions through oral presentations and question-and-answer sessions. They will present their research at joint research meetings, workshops, and academic conferences, and respond to critiques from faculty members in various fields. The course will further hone students' ability to communicate their research results to the field and support their development as the next generation of global interdisciplinary researchers.

## Japanese History

Course Code	Course	Credit	Content of Subject
40JHS001**	Methods of Regional Studies	1	Methods of Regional Studies in AY 2024
40JHS002**	Investigation and Practical Use on Resources	1	Investigation and Practical Use on Resources in AY 2024
40JHS003**	Theories on Museum Communication	1	Theories on Museum Communication in AY 2024 (Not offered in AY2024)
40JHS004**	Integrated Studies of Cultural and Research Resources	2	Integrated Studies of Cultural and Research Resources in AY 2024
40JHS005**	Classical Japan Resource Materials	2	Study on Research of Archival Materials in Classical Japan
40JHS006**	Medieval Japan Resource Materials	2	(Not offered in AY2024)
40JHS007**	Early Modern Japan Resource Materials	2	Study on Historical Materials in Early Modern Japan and Local Historical Material Studies
40JHS008**	Modern and Contemporary Resource Materials	2	Collection, Arrangement, and Use of Modern and Contemporary Resource Materials
40JHS009**	Inscriptions and Written Texts from Archaeological Sites	2	Characteristics and Use of Inscriptions and Written Texts from Archaeological Sites
40JHS010**	Archaeological Materials	2	Study on Research of Archaeological Materials
40JHS011**	Folklore	2	Study on Traditional Industry and Merchant's Family
40JHS012**	Source Materials: Material Culture	2	Material culture on Representation
40JHS013**	Source Materials: Folk Culture	2	The Study on Traditions from a Folk Cultural Perspective
40JHS014**	Source Materials: Visual Images	2	Ancient Manor Pictorial Map Research
40JHS015**	Source Materials: Arts and Crafts	2	Use of Visual Materials from an Art Historical Perspective
40JHS016**	Analytical Research Methods	2	Scientific Research on Historical Materials
40JHS017**	Chronological Study on Materials	2	Application of Chronological Research on History and Archaeology
40JHS018**	Preservation Conservation of Cultural Properties	2	Studies on preventive conservation
40JHS019**	Historical Information Science	2	Application of Digital Technology to Research and Exhibition about Japanese History
40JHS020**	Social History of Ancient Japan	2	Studies of Japanese Prehistory
40JHS021**	History of Technology in Ancient Japan	2	Study on prehistory and ancient technique used for Archaeological Materials
40JHS022**	History of Technology in Medieval Japan	2	Study on Medieval Manufacturing Technique Used for Archaeological Materials
40JHS023**	History of Technology in Early Modern Japan	2	Technical analysis of early modern textiles



## Japanese History

Course Code	Course	Credit	Content of Subject
40JHS024**	Ecological Environmental History	2	Livelihood Changes in Early Modern to Modern East Asia
40JHS025**	Study of Transmission of Rural Practice	2	Study of SAIJIKI, Guides to the Cycle of Annual Events
40JHS026**	Study of Transmission of Urban Practice	2	Approach about urban folk culture from the view to the story represented by various media
40JHS027**	Study of Transmission of Religious Practice	2	Japanese folk religion, faith, and history of cultural exchange
40JHS028**	Filmmaking as a Research Method	2	Theoretical and Methodological Study on Research Filmmaking
40JHS029**	History of Japan–Europe Exchange : Material Culture	2	Study on Japan–Europe Material Cultural Exchange in the 16th–19th centuries
40JHS030**	Study on Diplomatic Relations between Japan and the West	2	Study on Diplomatic Relations between Japan and the West
40JHS031**	Study on Political Relationship in Asia	2	Study on the Historical Relationship between Japan and Korea in the Yayoi–Kofun Period
40JHS032**	The Cultural Interaction with Regions in Historical Asian World	2	Studies on the Interaction with Materials excavated from Archaeological Site in East Asia
80JHS001**	Basic Seminar III	1	Research Presentation by Students
80JHS002**	Basic Seminar IV	1	Research Presentation by Students
40JHS033**	Research on Exhibits of History	2	Research on Exhibits of Modern History
40JHS034**	Social History of Early Modern Japan	2	Local Communities and Popular Culture in Early Modern Japan
40JHS035**	Modern and Contemporary Social History	2	History of Local Communities and Popular and Cultural Movements in the Postwar Japan
20DJHd04**	Social History of Medieval Japan	2	Not offered for a while
20DJHe14**	Environmental Folklore	2	Not offered for a while

## Japanese Literature

Course Code	Course	Credit	Content of Subject
40JLT001**	Introduction to Archival Studies	2	<p>The course will include visits to archives preservation and use institutions to understand the essence and structure of archives from interdisciplinary perspectives such as history, informatics, and records management, and to systematically learn scientific management and operation systems to permanently protect and utilize archives, from collection and transfer to preservation and use.</p> <p>【Learning objectives】</p> <p>To systematically master archives science, which is the foundation for advanced research in diverse academic fields. In particular, the course will provide an opportunity to expand one's perspective on the preservation and utilization of archival materials, and to consider how to utilize one's own research in the community, based on the professional archivist's code of ethics. (Omnibus format / 15 sessions)</p> <p>(Kumiko Fujizane/5 sessions) General Theory of Archives, Theory of Archival Resources</p> <p>(Shintaro Nishimura, Naohiro Ota, Guest Speaker/10 times) (Joint) Archives management theory, Practice of archives management.</p>
40JLT002**	Comprehensive Bibliographical Studies	2	<p>Books contain a variety of human activities that go beyond the original purpose of the book and the genre to which it belongs. In this class, we will explore interdisciplinary approaches through collaboration among various fields such as bibliography, linguistics, history, and iconography in order to enrich the humanities by utilizing the vast number of books that have been handed down in Japan. Outside lecturers will be invited to participate in the program as necessary.</p> <p>【Learning objectives】</p> <p>By analyzing the books brought to Japan from various perspectives, including bibliography, history, notation, and iconography, the program will provide a comprehensive view of the diverse issues encompassed by Japanese books.</p>
40JLT003**	Basic English Expression Seminar	2	<p>This course teaches students how to present their research in English to English-speaking audiences. Through in-class presentations and assigned readings, students will have opportunities to enhance their general proficiency in English and gain a deeper understanding of how concepts specific to their areas of specialization can be expressed in English.</p>
40JLT004**	Advanced Presentation Skills Seminar	1	<p>The aim of this class is to acquire the ability to present research and results accurately and effectively. Students will have a chance to learn the universal design for research presentations. This class also includes practical training such as presentations at various academic societies and international conferences held at the institute.</p> <p>【Learning objectives】</p> <ul style="list-style-type: none"> <li>•At the end of this class, students will be able to make presentations by using slides and posters with a concise and visually considered structure.</li> <li>•The class also aims to learn how cite prior research and images.</li> </ul>
40JLT005**	Resource Research Seminar	1	<p>The aim of this class is to understand Japanese classical texts and Meiji-period literature comprehensively and acquire research methods, including an understanding of the characteristics of Japanese classical texts and their historical changes. This class will help students understand the elements of a book, such as the cover and ryoshi, and acquire analytical techniques. It also enhances the development of students' skill to analyze the elements of a book and understand the information from them. This class will also deal with bibliography, philology, book collection history, etc., including knowledge related to book distribution such as book stamps, publishing culture. From a complex perspective of them, students will learn the approach of research on Meiji period literature.</p>

## Japanese Literature

Course Code	Course	Credit	Content of Subject
40JLT006**	Introduction to Research Methods in Literature 1	2	<p>This class will be delivered in an omnibus style. The faculty members of <a href="#">the Japanese Literature Program</a> will present their research by using historical materials such as documents, images, and records.</p> <p>【Learning objectives】</p> <ul style="list-style-type: none"> <li>•At the end of this class, students will be able to understand and explain the current status and issues of research related to documents, images, and archival materials.</li> <li>•The class also aims to develop students' ability to explain historical materials dealing in their research in the context of philology or archival research.</li> </ul>
40JLT007**	Introduction to Research Methods in Literature 2	2	<p>This class will be delivered in an omnibus style. The faculty members of <a href="#">the Japanese Literature Program</a> will present their research by using historical materials such as documents, images, and records.</p> <p>【Learning objectives】</p> <ul style="list-style-type: none"> <li>•At the end of this class, students will be able to understand and explain the current status and issues of research related to documents, images, and archival materials.</li> <li>•The class also aims to develop students' ability to explain historical materials dealing in their research in the context of philology or archival research.</li> </ul>
40JLT008**	Calligraphy and Manuscript Culture 1	2	<p>This class is intended to study the Japanese culture of calligraphic transcription with a focus on Japanese poetry through discussions and examinations on various materials and different forms. Specifically, the study starts with discussions on individual materials in relation to the composition of Japanese poems and examines actual materials. Observations are given from various perspectives such as the characteristics and historical transition of the styles and forms of Japanese poetry to identify its significance in the context of cultural history.</p> <p>【Learning objectives】</p> <p>At the end of this class, students will be able to understand the Japanese culture of calligraphic focusing on manuscripts and explain about it, developing the skill to handle original materials in their research.</p>
40JLT009**	Print Culture 1	2	<p>This course will focus on Japanese classical literature, especially in the latter half of the Edo period. The course will cover literacy in handling and reading printed books, as well as the process of their establishment, dissemination, and transmission. In addition, methods of research, analysis, and interpretation of each material will be lectured. (Lecture)</p> <p>【Learning objectives】</p> <p>The goal is to enable students to conduct comprehensive research on the cultural characteristics expressed in the materials from a variety of perspectives.</p>
40JLT010**	Print Culture 2	2	<p>The purpose of this course is to understand publications in terms of their styles. Like manuscripts, published books have their own styles such as size and design. Compared to manuscripts, publications as handicraft products also seem to be firmly stylized for technical and economic reasons. Focusing on the aspect of publications as goods, we will examine such style-related issues by looking at specific examples.</p>
40JLT011**	Resource Accumulation 1	2	<p>In this class, we will use historical archives created, exchanged, and accumulated by the shogunate, various feudal lords, and villagers in the early modern period of Japan, and learn the methods of research and analysis necessary to organize and utilize various information there. Classes consist of explanations of basic matters related to archives used as teaching materials, as well as exercises related to deciphering, organizing, and analyzing information.</p>

## Japanese Literature

Course Code	Course	Credit	Content of Subject
40JLT012**	Formation of Literary Works 1	2	<p>This class deals with Muromachi Monogatari (Otogi Zoshi) which was acclaimed and enjoyed with illustrations in early modern Japan. By examining the Nara picture books and picture scrolls in the collection of the National Institute of Japanese Literature, students will learn research methods and current research level while reading some of the works.</p> <p>The class is intended to look at narratives, performing arts, picture materials, folklore, topography, etc., so that students can understand both the text and the illustrations from various viewpoints, considering the various aspects of the arts and society of the era. (Lectures and exercises)</p>
40JLT013**	Formation of Literary Works 2	2	<p>In this class, we will learn about the Hyakunin Isshu, the most popular book of poetry in the history of Japanese literature, and consider the significance of waka in the history of Japanese literature by reading and understanding individual waka poems. In reading and understanding the Hyakunin Isshu, we will emphasize the relationship between the poet and his family collection.</p>
40JLT014**	Reception of Literary Works 1	2	<p>How did classics develop in the Edo period, and what effects did that have? How did it relate to the trends of earlymodern literature and the history of literature?</p> <p>To give consideration to Edo in terms of the times, it is extremely important to fully understand the actual conditions of the development of the “knowledge” base of the people of Edo. This course is intended to clarify various aspects of the genealogy of “education” descended from Court nobles through careful reading of commentaries that came into being in the Edo period.</p>
40JLT015**	Reception of Literary Works 2	2	<p>•In this class, we will analyze Japanese Novels in modern era, comparing with pretexts.  <b>【Learning objectives】</b>          •Learn about the intellectual foundations referred to by creators in modern Japan and their utilization.</p>
40JLT016**	Literary Thought 1	2	<p>In this class, we will examine the relationship between the Rinzai school of Zen Buddhism and Japanese society, focusing on the many kana-hōgo published from the early modern period. The definition of “kana-hōgo” has not yet been settled, and it may refer to literary works incorporating fiction (e.g., kana-zoshi) or literature introducing the doctrines of various Zen sects, but here we will focus only on texts, written in Japanese, exposing the teachings of specific Zen monks.</p> <p>In modern times, Buddhist doctrines were transmitted to society through multiple media, and it is important to place Zen priests’ kana-hōgo in this “horizontal” context. On the other hand, it is also necessary to look at the “vertical” history of Zen Buddhism.</p> <p>Since “Kana-hōgo” is a kind of introductory book, this class will consider the relationship between Buddhist doctrines and Japanese culture, with a focus on Zen Buddhism, while learning how to look up basic Buddhist terminology.</p> <p>The goal of this class is to be able to decipher simple Buddhist scriptures (written in kana), to master the basic doctrines of Buddhism and Zen Buddhism, to understand the basic relationship between Buddhism and Japanese society in the Middle Ages, from a historical and ideological perspective.</p>

## Japanese Literature

Course Code	Course	Credit	Content of Subject
40JLT017**	Literature and Art 1	2	In this class, students will transcribe, annotate, and translate works of Sinitic poetry and prose by Edo- and Meiji-period Japanese authors with the goal of uncovering the ways in which Sinitic texts were read and/or written within a specific social, cultural, and historical context in early modern and modern Japan. An important question to consider is how one might compare Sinitic texts produced in Japan and elsewhere in the Sinographic sphere.
40JLT018**	Literature and Art 2	2	In this course, we will examine the impact of various historical and cultural facts and anecdotes that were investigated and analyzed in the genre of Kōshō essays (考証随筆) which was widely published during the Edo and Meiji periods, on literature, as well as the methods used to verify them. The results of the focus on precedents, recording them, and the interpretation of those precedents were published in large numbers during the Edo period, and were even followed up on and critiqued. By checking the interconnectedness of these works, it will be possible to confirm the topics of discussion in the cultural sphere of the time. This course will specifically examine how this method, which is also used in novels and other works as evidence, is effective in making works that tend to be ridiculous seem more realistic. 【Learning objectives】 •Students will be able to understand and explain the cultural background of the works to be discussed. •Understand the role of Kōshō essays in Japanese literature.
40JLT019**	Literature and Society 1	2	In this course, students will grasp the organic relationship among books (publications and manuscripts), bookstores, and social change. Specifically, we will review of primary historical documents related to books from the early modern period to the end of the Edo period and the Meiji Restoration, and decipher and discuss them through historical criticism. 【Learning objectives】 •The book was a powerful medium, and how did the authorities distance themselves from it from time to time? How were books produced in a cycle between the passion of authors and publishers and the demands and reactions of buyers and readers? •Students will be able to understand and explain the social and cultural structure of the historical books they are researching using what they have learned in this course.
40JLT020**	Approaches to Literary Informatics 1	2	The use of computers for Pre-modern Japanese works has been increasing in recent years. This course aims to help students acquire the basic knowledge and skills needed to use computers for this purpose.
40JLT021**	Perspectives on Printed Books and Scrolls 1	2	Please refer to the WebSyllabus 2024
40JLT022**	Perspectives on Archival Materials Research 1	2	In this class, we will focus on digital archives, which are an essential infrastructure for the humanities. Students will learn practically how to preserve records formed by society and how to utilize them. Additionally, by addressing digital humanities as a case of data utilization in humanities research, we aim to provide students with content that is useful for writing academic papers. (Lectures and exercises) 【Learning objectives】 The aim of this class is to help students to acquire the skills and knowledge to understand recorded information and use it to write thesis, understanding the process of compiling recorded information in the modern era and the state and values of the records in the society.

## Japanese Literature

Course Code	Course	Credit	Content of Subject
40JLT023**	Perspectives on Archival Materials Research 2	2	First of all, this course looks at the case of imperial court archives as an example of how recorded information was compiled in Japan's early modern period. Students will consider how recorded information from the imperial court was archived, with particular focus on recorded information related to the management of documents from early-modern court nobles, an area that suffers from a dearth of research. Secondly, lectures and practices on the conservation and utilization of regional archives.
20DJLd26**	Documents as Information Ⅲ	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022

## Japanese Language Sciences

Course Code	Course	Credit	Content of Subject
40JLS001**	Foundations of linguistic research Ⅲ A	2	A rotating series of lectures on advanced topics in the study of the Japanese language, given by NINJAL full-time teaching staffs.
40JLS002**	Foundations of linguistic research Ⅲ B	2	A rotating series of lectures on advanced topics in the study of the Japanese language, given by NINJAL full-time teaching staffs.
40JLS003**	Studies in language resources	2	Lectures on how to use, design and build various language resources such as corpora.
40JLS004**	Japanese Information Processing	2	The aim is to acquire practical knowledge of analysing Japanese corpora.
40JLS005**	Theoretical and contrastive linguistics	2	An overview of major approaches of theoretical and contrastive linguistics and an introduction to computational linguistics.
40JLS006**	Field linguistics	2	The goal of this course is to acquire the fundamentals of field linguistics for comprehensive description or sociolinguistic analysis of the system of regional and social varieties of Japanese and Ryukyuan languages.
40JLS007**	Applied linguistics	2	This course will cover multifaceted approaches to language education from linguistic, psychological, and social perspectives.
40JLS008**	History of Japanese	2	The aim is to learn how to analyze the history of Japanese using written materials.
40JLS009**	Seminar in language resources 1	2	Practical exercises on the construction of language resources for written Japanese.
40JLS010**	Seminar in language resources 2	2	Practical exercises on the construction of language resources for spoken Japanese.
40JLS011**	Seminar in Information processing in Japanese	2	The aim is to develop practical skills in analysing Japanese corpora.
40JLS012**	Seminar in field linguistics	2	The goal of this course is to cultivate the skills required for empirical field linguistics of regional and social varieties of Japanese and Ryukyuan languages through exercises.
40JLS013**	Practices in academic communication in English	1	The goal is acquiring skills in understanding a chosen field's literature, describing phenomena, and presenting analyses in English.
80JLS001**	Seminar in linguistic research Ⅲ	2	Lectures are given by researchers from within and outside NINJAL. Students take turns giving presentations on their research proposals.
80JLS002**	Seminar in linguistic research Ⅳ	2	Lectures are given by researchers from within and outside NINJAL. Students take turns giving presentations on their research progress.

## Informatics

Course Code	Course	Credit	Content of Subject
40INF001**	Introduction to Mathematical Logic	2	Basic knowledge of mathematical logic, in particular, first-order logic will be explained. The aim is to be able to write proofs in first-order logic and explaining soundness theorem and completeness theorem, and explain Hoare logic, sequent system, and Peano arithmetic.
40INF002**	Introduction to Algorithms	2	Give an introduction to the algorithm theory, including complexity, order, sorting algorithm, data structures such as heap and binary trees. We also show some optimization algorithms and string, enumeration algorithms.
40INF003**	High-Performance Computing	2	This course gives lectures on theory, implementation, application and future directions of the high performance computing technology utilizing supercomputers, PC clusters, on-chip multiprocessors and grid computing.
40INF004**	Information Sharing System Architecture	2	This course will discuss information and communication network architectures, including (1) advanced networking technologies and network systems technologies for a variety of telecommunication network services, (2) circuit switching and packet switching, network layering and each layer's function and (3) security technology.
40INF005**	Applied Linear Algebra	2	Linear algebra is significantly essential in natural science and engineering. Moreover, it becomes to play an important role in data science recent years. In this lecture, we will learn the basic properties and numerical methods of linear algebra. We will also learn about practical applications.
40INF006**	Introduction to Software Science 1	2	This course presents two main themes in Software Science, representation of software (programming and modeling) and software systems.
40INF007**	Introduction to Software Science 2	2	This course presents basic knowledge of Software Science focusing on data management, data processing, and data analysis, including topics such as data engineering, data modeling, data mining, and real-world data analysis.
40INF008**	Introduction to Multimedia Information Science	2	Faculty members in Multimedia Information Science will give lectures on various topics covered by multimedia information sciences. Through this course, students will acquire knowledge in the fundamental fields that make up multimedia information sciences and will be able to apply it for their own purposes.
40INF009**	Introduction to Intelligent Systems Science 1	2	Lectures are given on the fundamentals of intelligent systems science, including artificial intelligence, human-agent interaction, machine learning, natural language processing and intelligent robotics, vision and language, recommender systems.
40INF010**	Introduction to Intelligent Systems Science 2	2	This course gives knowledge on fundamental fields, such as machine learning, information geometry, natural language processing, deep learning, semantic web, data analytical methods, and computational social science for intelligent systems science.



## Informatics

Course Code	Course	Credit	Content of Subject
40INF011**	Introduction to Information Environment Science	2	As the progress of information technology, interaction of society, technology and information is facing great changes. This course introduces researches on creation, distribution, usage and storage of information. Participants are expected to understand the issues and trend of researches on the relationships between information and society.
40INF012**	Scientific Presentation	1	These lectures provide practical instruction for students to improve their presentation materials and presenting skills. We explore in detail the function, structure, form, and content of scientific presentations. Students also work together to provide feedback and suggestions for improving their scientific presentations.
40INF013**	Scientific Writing	1	Strategies for scientific writing will be examined. The students will be asked to read the titles, abstracts and introductions of several real research papers of varying quality, and to critique them in light of organizational principles. Students will be encouraged to supply samples of their own technical writing for analysis by the class.
40INF014**	Introduction to Information Security Infrastructure	2	Information security technology, service, system, rule, and law give a fundamental framework for providing ICT (information and communication technology) systems and services. This course will introduce information security and give its explain in an ICT governance way.
40INF015**	Introduction to Big Data Science	2	This course will introduce basic concepts and methodologies of large scale data processing, analysis, security, and visualization by discussing relevant applications.
40INF016**	Practical Data Science	2	To practice data science, several researchers take turns to present and discuss subjects such as data acquisition, data construction, data visualization and data analysis.
40INF017**	Robot Informatics	2	This course introduces the basic knowledge of informatics that is required to develop intelligent robot systems. It also focuses on real-time sensor information processing and system integration method for the development of robot systems.
40INF018**	Natural Language Processing	2	This course aims to introduce the fundamental techniques of natural language processing (NLP), i.e. the study of human languages from a computational and engineering perspective. Basic topics include part-of-speech tagging, lexical analysis, syntactic and discourse parsing, language modeling, and word sense disambiguation. Dialogue system and question answering are included as practical applications. We also learn about cutting-edge research and deepen understanding of current issues and future developments.
40INF019**	ICT-enabled Business	2	Understanding the basic technology for ICT-enabled services and its application. This course focuses on how E-business including Electronic Commerce or Electronic Money affects the economic activity or social structure.
40INF020**	Introduction to Statistical Methods in Bibliometrics	2	In this course, students learn basic statistical methods and multivariate analysis techniques, with the expectation of gaining insights into academic communities and educational activities through the statistical analysis of bibliographic data, and educational data.

## Informatics

Course Code	Course	Credit	Content of Subject
40INF021**	Logic in Computer Science	2	Type theory gives a fundamental framework for programming languages and software specification. This course will introduce type theory and explain it in a mathematically rigorous way. The aim is complete mathematical understanding of the introductory part of type theory, and the ability of applying type theory to practical problems.
40INF022**	Discrete Mathematics	2	Discrete mathematics has become popular in recent decades because of its applications to computer science. Concepts and notations from discrete mathematics are useful to study or describe objects or problems in computer algorithms and programming languages.
40INF023**	Computational Complexity Theory	2	In this lecture, we explain the basics of computational complexity theory. The topics include the P versus NP problem, the theory of NP-completeness, and the relativization barriers.
40INF024**	Computational Game Theory	2	Game theory is the mathematical theory that models the strategic interactions among self-interested agents. This course covers selected theoretical topics in algorithmic game theory that aims to understand the design of the algorithms in strategic environments. The course's topics include: solution concepts in game theory, such as Nash equilibrium and correlated equilibrium, and their computation; computational social choice: procedures for fair division, such as cake cutting algorithms.
40INF025**	Computer System Design	2	This course will focus on (1) computer architecture including high-performance microprocessors and LSI technologies, and (2) system software stack, including communication mechanisms and parallel file systems, all of which are indispensable for designing highly-reliable high-performance computer systems.
40INF026**	Information and Communication Systems	2	This course provides an introduction of the principle, algorithms, system architecture, wireless communications basics, and performance evaluation methods of information and communication systems. (lecture)
40INF027**	Distributed Systems	2	Distributed systems are widely used from IoT to cloud computing nowadays. This lecture explains basic concepts on distributed systems, e.g., distributed algorithms and protocols and then advanced knowledges, e.g., distributed system architecture and distributed data processing, to understand distributed systems.
40INF028**	Software Engineering	2	In this lecture class, students learn software engineering techniques for efficient development and operation of large-scale, high-quality software. We have overview of activities and techniques for each phase in the development process is given. We also have discussion over various development paradigms as well as state-of-the-art topics.

## Informatics

Course Code	Course	Credit	Content of Subject
40INF029**	Database Theory	2	This class introduce database theory based on database programming languages. Especially, Datalog, which is a logical foundation of query languages in relational databases, is used.
40INF030**	Programming Languages and Theory	2	Learn about the basics of programming languages and implement a small language, using the book "Types and programming languages" as a textbook.
40INF031**	Mathematical Structures in Formal Methods	2	Model checking is a fundamental technique in software science. The course introduces its mathematical theory and practical algorithms. Our emphasis is especially on the mathematical theory of fixed points, formulated in lattice theory and category theory.
40INF032**	Software Verification	2	This course gives a lecture on technologies for software verification. In particular, it introduces techniques based on type systems, which make it possible to verify software exhaustively and rigorously.
40INF033**	Fundamentals of Media Processing	2	This course explains the overview of the basic technologies related to whole aspect of media processing especially pattern recognition theory and signal processing theory. These technologies are indispensable for media analysis, feature extraction, media conversion, and so on. Project works such as video information processing will be assigned upon necessity to deepen the understanding.
40INF034**	Applications of Multimedia Processing	2	Students will learn techniques for processing, analyzing, processing/editing, and presenting media such as audio and images as examples of media processing applications. Specifically, image processing, image analysis, image generation, and audio information processing will be studied, including mathematics and implementable algorithms. Advanced multimedia technologies combining these techniques will also be studied as needed. Students will acquire basic concepts and algorithms related to media processing and be able to apply them to their own work.
40INF035**	Deep Learning	2	In this course, we will study the basic techniques underlying Deep Learning and its main architectures, including Neural Networks, Convolutional Neural Networks, Recurrent Neural Networks, Transformers, and so on. We will also discuss practical examples of Deep Learning applied to intelligent drones and time series analysis.
40INF036**	Communication Environments	2	We exchange a variety of information with others and build relationships not only in face-to-face situations, but also via mobile phones and the Internet. To discuss such "communication environments" in our daily lives, this lecture comprehensively discusses the usefulness of related previous studies and their methodologies.

## Informatics

Course Code	Course	Credit	Content of Subject
40INF037**	Data Mining	2	This course introduces data mining from theory to practice.
40INF038**	Methodology of Scientometrics	2	To be able to quantitatively grasp the trends in science and analyze and judge the current situation and problems, after understanding the quantitative methods for science.
40INF039**	Sublinear Algorithms	2	“Efficient” algorithms have meant polynomial-time algorithms. As the data size is increasingly large, however, even polynomial-time algorithms could be too slow. To handle such large data, sublinear-time algorithms, especially, the framework of “property testing”, have been developed in the last decades, where sublinear means less than linear. This course will cover theoretical foundations of sublinear-time algorithms.
40INF040**	Algorithmic Market Design	2	Market design is a field of research that considers how to design rules of markets, such as matching and auction markets. Through game-theoretic analysis, this field aims to design market rules that yield socially desirable outcomes, while each participant acts selfishly. In this course, we learn the theory and applications of market design, while laying emphasis on its algorithmic and discrete mathematical aspects.
40INF041**	Combinatorial Optimization for Machine Learning	2	Machine learning tasks often involve combinatorial structures. To design an efficient algorithm for these problems, techniques of combinatorial optimization are indispensable. This course will cover the theory of combinatorial optimization, such as submodular optimization and approximation algorithms, and its applications to machine learning.
40INF042**	Probabilistic Models in Informatics	2	This course focuses on probabilistic models in informatics, which play important roles in the modeling of real-world data. The course includes the basics of probability theory, characteristics of probabilistic models, and challenges and evaluation issues in terms of applying probability-based machine learning for real-world applications.
40INF043**	Interactive Media	2	In this lecture, we discuss human-machine interaction and human-human interaction as examples of media processing applications. Specifically, there are explanations of basic methods such as modeling, design methods, evaluation methods, and machine learning, as well as information retrieval, reading comprehension, large-scale processing, and security. *Students are required to have taken the course “Fundamentals of Media Processing” before taking this course.

## Informatics

Course Code	Course	Credit	Content of Subject
40INF044**	Knowledge Sharing System	2	This lecture will discuss the realization of knowledge sharing through knowledge representation techniques, a branch of artificial intelligence. First, the history of information sharing in society will be introduced by reviewing the development of the Internet to date. Then, the importance of the Semantic Web concept in the transition from information sharing to knowledge sharing will be explicated. The lecture will focus on how knowledge sharing on the Internet can be done with the Semantic Web. First, an overview of the Semantic Web will be presented,
40INF045**	Computational Social Science	2	Computational social science is the study of quantitative and theoretical understanding of human behavior and economic, social, and political phenomena by capturing, analyzing, and modeling large-scale economic, social, and political data through information technology. In this course, students will learn basic concepts of social science, applications of information technology, and social scientific interpretation, which are necessary for researchers in information science to tackle questions in social science. *Not open to students who have earned credits in "Econophysics" by FY2020.
40INF046**	Embedded Real-Time Systems	2	Real-time and embedded systems pervade many aspects of modern life ranging from mobile communications, robotics, medical systems and devices, motion control systems, transportation systems, energy generation and management, to aerospace and aircraft systems. This course covers both the core concepts underlying such systems and application-level concepts. First, the course focuses on the core concepts and principles, including resource management, task scheduling, dependability and system safety. Also, the course offers the application-level discussions for Cyber-Physical Systems (CPS) and Internet-of-Things (IoT), and real-time networks.
40INF047**	Quantum Algorithms	2	This lecture covers the basics of quantum algorithms and their implementation, extending to the physical aspects of the implementation. The lectures are structured into input and output sections. During the input sections, students will learn relevant contents through video materials registered at the Quantum Academy of Science and Technology Online Learning System (QOLS). During the output sections, they will prepare presentations based on these contents. The students will present in front of their peers, followed by a discussion involving both the students and the lecturer.
80INF001**	Experiment and Seminar on Basic Knowledge in Informatics I A	2	Under the close guidance of the faculty advisor, students will plan and conduct experiments, analyze the results of experiments, and conduct exercises to acquire the basic knowledge required for conducting research in informatics and the advanced knowledge needed to solve fundamental problems in informatics.

## Informatics

Course Code	Course	Credit	Content of Subject
80INF002**	Experiment and Seminar on Basic Knowledge in Informatics I B	2	Under the close guidance of the faculty advisor, students will plan and conduct experiments, analyze the results of experiments, and conduct exercises to acquire the basic knowledge required for conducting research in informatics and the advanced knowledge needed to solve fundamental problems in informatics.
80INF003**	Experiment and Seminar on Basic Knowledge in Informatics II A	2	Under the close guidance of the faculty advisor, students will plan and conduct experiments, analyze the results of experiments, and conduct exercises to acquire the basic knowledge required for conducting research in informatics and the advanced knowledge needed to solve fundamental problems in informatics.
80INF004**	Experiment and Seminar on Basic Knowledge in Informatics II B	2	Under the close guidance of the advisor, students will acquire the basic and advanced knowledge necessary for conducting research in informatics, and will plan and conduct experiments, analyze the results of experiments, and practice exercises in order to achieve a level at which they can summarize their progress and report on their research.
90DIFg18**	Research in Informatics for Master Thesis II B	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS001**	Introduction to Time Series and Spatial Modeling	2	<p>This course introduces the foundations of time series analysis, point process, and spatial/spatio-temporal modeling. Emphasis is placed on statistical modeling and model selection by information criteria.</p> <p>※Students who have already taken "Introduction to Statistical Modeling I (10SMS001)", "Introduction to Statistical Modeling II (10SMS002)" can't take this course.</p>
40STS002**	Introduction to Multivariate Analysis	2	<p>This course deals with a wide range of techniques (regression analysis, discriminant analysis, principal component analysis, factor analysis, covariance structure analysis, etc.) for analyzing multivariate data.</p> <p>※Students who have already taken "Introduction to Statistical Data Science I (10SMS003)" "Introduction to Statistical Data Science II (10SMS004)" can't take this subject.</p>
40STS003**	Introduction to Probability and Stochastic Processes	2	<p>The lectures in this subject explore fundamental concepts relating to theories of probability and stochastic processes. More specifically, the subject covers probability space, random variable, convergence, generating and characteristic functions, Poisson process, and Markov chain.</p> <p>※Students who have already taken "Introduction to Statistical Inference I (10SMS005)" can't take this subject.</p>
40STS004**	Introduction to Mathematical Statistics	2	<p>This lecture course provides an overview of the theory of mathematical statistics. The main topic of the course is the theory of statistical inference. Specifically, the course deals with summary statistics, sampling distributions, point estimation, interval estimation, hypothesis testing and regression models. Applications of the theory of mathematical statistics to real problems are also discussed.</p> <p>※Students who have already taken "Introduction to Statistical Inference II (10SMS006)" can't take this subject.</p>

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS005**	Introduction to Computational Mathematics	2	The lectures cover fundamentals of computational mathematics such as matrix differential calculus, theory and algorithms of applied/numerical linear algebra, linear programming, integer programming, dynamic programming, theory and algorithms of optimization, and conic programming. ※Students who have already taken "Computational Methodology in Statistical Inference I (10SMS007)" can't take this subject.
40STS006**	Introduction to Statistical Machine Learning	2	The lectures discuss methods and theory of statistical machine learning including support vector machines, deep learning, Gaussian processes, ensemble learning, transfer learning, reinforcement learning, and statistical learning theory. ※Students who have already taken "Computational Methodology in Statistical II (10SMS008)" can't take this subject.
40STS007**	Introduction to Computational Inference	2	This course deals with methodologies in computational statistics with their applications in statistics and machine learning. Topics include nonparametric bootstrap, Markov chain Monte Carlo, particle filter, graphical modeling and belief propagation, EM algorithm, and variational Bayesian inference. ※Students who have already taken "Computational Methodology in Statistical II (10SMS008)" can't take this subject.
40STS008**	Special Topics in Statistical Modeling	2	The course will discuss the basics of the inference for un-normalized models and sparse modeling and its applications. Also, methodologies of formulating problems into "solvable" forms for various real-world problems are discussed.
40STS009**	Complex Systems Analysis	2	The lecture will discuss deterministic and probabilistic approaches to time series data analysis and modeling. In addition, students take turns reading books and papers about detecting significant signals, spatial correlations, and causality in time series data.
40STS010**	Special Topics in Modeling 1	2	Shannon's information theory is lectured as a basic theory for analysis of information sources. The amount of information, entropy, and communication systems are discussed. And actual radio communication systems are lectured.



## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS011**	Special Topics in Modeling 2	2	This course deals with advanced computational statistics with their applications. Examples are specialized topics in Markov Chain Monte Carlo, sequential Monte Carlo, bootstrap, and their applications in Bayesian statistics and model selection.
40STS012**	Special Topics in Time Series Analysis	2	After covering the basics of stationary time series models that were not fully covered in Introduction to Time Series and Spatial Modeling, causality analysis based on multivariate autoregressive (VAR) models, impulse responses, etc. will be covered. After introducing unit root tests, we will expand our understanding to cointegration models. With financial time series (rate of return data) in mind, the conditional heteroscedasticity models will be outlined. In addition, time-varying variance modeling will be discussed in relation to local stationary AR models and non-Gaussian filters. Computer exercises using R or R Shiny applications will be conducted once after every two or three lectures.
40STS013**	Stochastic Modeling	2	This course provides an introduction to stochastic processes, with their applications to real-world situations. This course covers elementary stochastic processes such as Gaussian, Poisson, Markov and renewal processes.
40STS014**	Special Course on Data Assimilation	2	This is a course of seminar and practice on sequential data assimilation methods or variational data assimilation methods. On the basis of the state-space model, students derive the sequential methods or the variational methods, and implement the procedure.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS015**	Basic Theory of Point Processes	2	This course is on the fundamental mathematical theory of point processes. It introduces basic concepts and theories related point processes, including random measures, Janossy measures, Janossy density, Campbell measure, moment measure, conditional intensity, Papangelou intensity, and Palm intensity. Its objectives include: (1) To learn the point process theory from the viewpoint of modern probability theory. (2) To understand the theoretical relationship between each type of point processes.
40STS016**	Applied Probability	2	In this lecture, we will outline the basics of stochastic processes, including Poisson processes, random walks, and Brownian motion, while showing examples of applications of stochastic processes. In addition, we will explain the mathematical economic analysis of resource management risks by applying macro-renewable resource supply forecasting and option theory, targeting renewable resources such as forests.
40STS017**	Multimedia Information Processing	2	The digital age has fostered the broadcasting of an ever increasing quantity of complex multimedia documents, be it through the internet or more versatile electronic channels. These evolutions have called for new tools and technologies to classify and analyze multimedia contents. We study in this course algorithms which are useful for these tasks.
40STS018**	Spatial Statistics and Stochastic Geometry	2	In this course, I will lecture spatial modeling for spatial data such as geostatistics, lattice model, directional statistics, and spatial point process, as well as random partitioning and random packing. Unlike the generalized linear model and its related statistics, a likelihood of a spatial model is not a simple product over independent data, which is one of essences for spatial modeling.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS019**	Genomic Data Analysis	2	<p>This course deals with data analysis of genetic information by applying the methods of statistical science.</p> <p>To infer the phylogenetic relationships of organisms, we compare homologous genes between organisms.</p> <p>Explanations and exercises will be given on how to construct a model for that purpose and maximum likelihood estimation of phylogenetic trees.</p>
40STS020**	Topics in Sampling Theory	2	<p>This course deals with the design of data collection, focusing on sample survey methods, and statistical inference under that design. Follow three topics will be covered: (1) sample survey methods used in social surveys, (2) design of experiments and observational studies in contrast to survey research, and (3) typical data analysis methods for survey data. The course will consist mainly of lectures, with some simple exercises in the latter part.</p>
40STS021**	Survey Design	2	<p>This course covers systematic explanations of practical methodologies of survey design for organizations or regions.</p>
40STS022**	Machine Learning for Statistical Natural Language Processing	2	<p>This course deals with the basic probabilistic framework for statistical treatment of natural language and related discrete data. It will cover the basic statistical and computational methods necessary to understand the characteristics of high-dimensional discrete data.</p>
40STS023**	Statistical Mathematics Seminar 1	1	<p>This is a general course of statistical science. Students are requested to attend the statistical mathematics seminar held at the institute of statistical mathematics to learn various recent developments in statistical science.</p>

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS024**	Statistical Mathematics Seminar 2	1	This is a general course of statistical science. Students are requested to attend the statistical mathematics seminar held at the institute of statistical mathematics to learn various recent developments in statistical science.
40STS025**	Statistical Mathematics Seminar 3	1	This is a general course of statistical science. Students are requested to attend the statistical mathematics seminar held at the institute of statistical mathematics to learn various recent developments in statistical science.
40STS026**	Statistical Mathematics Seminar 4	1	This is a general course of statistical science. Students are requested to attend the statistical mathematics seminar held at the institute of statistical mathematics to learn various recent developments in statistical science.
40STS027**	Statistical Mathematics Seminar 5	1	This is a general course of statistical science. Students are requested to attend the statistical mathematics seminar held at the institute of statistical mathematics to learn various recent developments in statistical science.
40STS028**	Special Topics in Statistical Inference and Mathematics 1	2	Probability theory is basic mathematics for statistical science. This course deals with mathematical topics that link to statistical applications.
40STS029**	Special Topics in Statistical Inference and Mathematics 2	2	One of the topics below will be chosen: (1) Distribution theory, asymptotic theory, statistical inference, (2) Gaussian random processes/fields, (3) Contingency table and graphical model, (4) Differential and integral geometric approach to statistics, (5) Algebraic statistics, (6) Random matrices, (7) Mathematics in statistics including convex analysis, combinatorics, and measure theory.
40STS030**	Statistical Computing	2	Lectures on statistical computing using a parallel computer will be given in this course. In particular, the following subjects will be discussed: problems which requires huge matrices, the particle filter using a parallel computer, and implementation of the ensemble Kalman filter on a parallel computer.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS031**	Information Security	2	This course covers major privacy-preserving techniques such as anonymization, differential privacy, and statistical disclosure control, which realize safe analysis of big data. We also cover topics on machine learning security with emphasis on empirical evaluation methods.
40STS032**	Bayesian Computation	2	The course covers some theoretical and methodological topics of Bayesian computation. Markov chain Monte Carlo methods are also covered.
40STS033**	Special Topics in Environmental Statistics	2	The goal of this course is to provide students with the ability to understand and implement the various statistical methods used in environmental data analysis. Students will read the textbooks and attend lectures on specific topics.
40STS034**	Financial Statistics	2	Concrete cases will be presented and research lectures will be given on theoretical methodologies for quantification of credit risk, risk assessment of financial markets, and investment strategies. In particular, students will acquire practical knowledge of statistical models that are consistent with relevant laws and regulations such as the Basel Accord and corporate accounting, forecasting using stochastic processes and time-series models, and risk assessment through the use of actual data.
40STS035**	Longitudinal Data Analysis	2	This course focus on the study of statistical models, such as linear mixed-effects models and their extensions, used in the longitudinal data analysis in which a response variable is measured repeatedly over time for multiple subjects. The course will also focus on the study of research designs, such as randomization, and on the study of statistical methods used in actual problems.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS036**	Special Topics in Biostatistics	2	This course deals with recent relevant topics on biostatistics, especially, (i) Biostatistical methodology on clinical and epidemiologic studies, (ii) Designs and analyses of clinical trials, (iii) Evidence synthesis methods, and (iv) statistical analyses of large-scale genomic data.
40STS037**	Application in Data Science	2	This course deals with various data analysis methods for practical applications, including statistical machine learning, deep learning, Bayesian inference, Python/R programming, etc., through several case studies including materials data analysis.
40STS038**	Bayesian Uncertainty Quantification for Engineering Applications	2	Students will learn about the concept and implementation of uncertainty quantification for Bayesian inference of physical models. Examples of model comes from structural engineering, geotechnical engineering, etc.
40STS039**	Statistical Inference	2	This course introduces the estimation and testing of regression models with nonlinearities and related statistical theory as basic topics, and treats sparse modeling, robust statistics, missing data analysis, divergence-based inference as advanced topics.
40STS040**	Statistical Machine Learning	2	Research work is directed on the methodology of statistical machine learning such as deep learning and kernel methods for analyzing large high-dimensional data. The course aims to provide students with knowledge of machine learning theory and methods, and the ability to apply machine learning methods to data analysis. The course will be conducted in the form of seminars, and students will be evaluated based on their presentations.
40STS041**	Special Topics in Signal Processing	2	Basic theories of signal processing such as Fourier and wavelet transforms, principal component analysis and independent component analysis are explained. Practical examples will be given, using sound processing, image processing, biomedical measurement signals and astronomical data analysis as examples.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS042**	Parametric Statistical Models	2	This course deals with either of the following two topics based on interests of students: (i) the theory of well-known probability distributions and related statistical models, or (ii) the theory of generalized linear models and its applications to real problems.
40STS043**	Systems Optimization	2	This course is intended to serve an introduction to systems design and focuses on the theoretical aspects of mathematical optimization based on convex analysis, duality theory, numerical linear algebra, and functional analysis.
40STS044**	Stochastic Models	2	This course discusses algebraic and combinatorial methods for stochastic computing arising in statistical inference.
40STS045**	Topics of Statistical Inference	2	We study the theory of semiparametric inference, its application and (or) some related topics. The standard knowledge of mathematical statistics and the basic mathematical skill on calculus, abstract linear algebra, metric space (or general topology) and probability theory are required.

## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS046**	Irregular Statistical Theory	2	After outlining asymptotic theory for regular statistical models, asymptotic theory for locally conic models will be introduced and the geometric methods required in their evaluation will be explained. Alternatively, after outlining the basic methods for causal inference, semiparametric approaches using propensity scores will be introduced and information criteria for causal inference models will be explained. The goal of the lecture is to provide fundamentals and developments of statistical asymptotics or causal inference.
40STS047**	Convex Analysis and Conic Optimization	2	In this course we will discuss the fundamentals of convex analysis such as separation theorems, subdifferential theory and several duality results. At the end, we will discuss some extensions and related topics. Alternatively, we might also discuss modelling and theoretical aspects of conic linear programs.
40STS048**	Topics in Computational Mathematics	2	This course deals with numerical algorithms in mathematical optimization and related areas. Specifically, we choose some topics in numerical algorithms for continuous optimization problems, matrix and eigenvalue problems, and so on, and discuss their mathematical foundations.
40STS049**	High Dimensional Probability and Statistics	2	This course discusses topics in probability and statistics in higher and infinite dimensions.
40STS050**	Mean Field Theory for Random System	2	Students will learn the mean field theory for random systems: (1) how to analyze magnetic models (2) basic analytical methods



## Statistical Science

Course Code	Course	Credit	Content of Subject
40STS051**	Introduction to Statistical Science	2	After dealing with probability including random variables, probability distributions, expectation and variance, students will learn methods indispensable for statistical analysis, such as point estimation, interval estimation and statistical hypothesis testing..
40STS052**	Survival Analysis	2	Survival analysis deals with patients' and/or equipments' survival time data. When analyzing survival data, one typically encounters incompletely observed survival times that are censored or truncated. This type of survival data arises in a variety of fields, including medicine, reliability, ecology, insurance, economics, finance, and marketing. In this course, we study statistical models and inference methods based on survival data.
40STS053**	Topics in combinatorial optimization	2	Lectures or seminars on basic topics of combinatorial optimization and algorithm design will be given. The topics will include linear programming, matching, network flows, matroids, and submodular functions, but other topics may be covered depending on the interests of the students.
40STS054**	Advanced Spatial Statistics	2	This lecture introduces statistical methods for spatial data and their applications. Specifically, methods in geostatistics, spatial econometrics, and relevant areas are introduced together with their implementation with R.
40STS055**	Differential Privacy	2	This course deals with differential privacy (DP), which is known as a de facto standard privacy notion for privacy protection. We first study some basic topics, such as the privacy properties of DP, the Laplace and exponential mechanisms, the composition theorems, and the SVT (Sparse Vector Technique). Then, we study more advanced topics, such as various extensions/variants of DP, the local model, and the shuffle model.
40STS056**	Nonlinear Optimization for Large-scale Machine Learning	2	Lecture and research guidance on nonlinear optimization algorithm and analysis, with a focus on those suitable for real problems in large-scale machine learning.

## Statistical Science

Course Code	Course	Credit	Content of Subject
80STS001**	Statistical Science Study 1	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS002**	Statistical Science Study 2	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS003**	Statistical Science Study 3	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS004**	Statistical Science Study 4	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS005**	Statistical Science Study 5	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS006**	Statistical Science Study 6	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS007**	Statistical Science Study 7	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS008**	Statistical Science Study 8	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS009**	Statistical Science Study 9	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.
80STS010**	Statistical Science Study 10	2	This is a general research course of statistical science. Students are requested to present progress of their research by giving seminars and talks.

## Particle and Nuclear Physics

Course Code	Course	Credit	Content of Subject
40COM001**	High Energy Accelerator Science Seminar 1	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40COM002**	High Energy Accelerator Science Seminar 2	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40PNP001**	Measurement and Control technology for Experimental Physics	2	Lectures on measurement and control techniques for radiation detectors at high-energy physics experiments. Lecturers cover a wide range of the related fields, such as semiconductor sensor, analog and digital signal processing, etc.
40PNP002**	Basic of Signal Processing for Sensors	1	The goal of this lecture is to learn the signal processing technologies and analog frontend circuits for highly integrated sensors such as imaging devices. A circuit simulator is used to effectively learn through interaction with instructor. The lecture also aims to acquire the basics of integrated circuit design.
40PNP003**	Theoretical Particle Physics 1	2	Lectures on the Standard Model of elementary particle physics based on experimental results.
40PNP004**	Theoretical Particle Physics 2	2	Lectures on the Standard Model of elementary particle physics based on experimental results.
40PNP005**	Theoretical Hadron and Nuclear Physics 1	2	Lectures on hadron and nuclear physics from a theoretical viewpoint at an introductory level. In particular, lectures will be focused on the static and dynamic properties of hadrons under vacuum and extreme conditions such as high temperature and high density.
40PNP006**	Theoretical Hadron and Nuclear Physics 2	2	Lectures on hadron and nuclear physics from a theoretical viewpoint at an introductory level. In particular, lectures will be focused on theoretical studies of hadronic many-body systems such as ordinary nuclei, hypernuclei and mesic nuclei.
40PNP007**	Theoretical Cosmophysics 1	2	Lectures on the structures and matter contents of the Universe and their origin from the standpoint of the evolutionary cosmology.
40PNP008**	Theoretical Cosmophysics 2	2	The goal of this lecture is to learn the basics of general relativity and cosmology. First we will study the basics of general relativity and subsequently the gauge invariant perturbation theory on which the modern cosmology is based. We also study various applications of the perturbation theory to observational cosmology. If time permits, we can also learn about quantum field theory in a curved spacetime and its applications.

## Particle and Nuclear Physics

Course Code	Course	Credit	Content of Subject
40PNP009**	Quantum Field Theory 1	2	Basic concepts in field theory which are indispensable for studying particle and nuclear physics.
40PNP010**	Quantum Field Theory 2	2	Basic concepts in field theory which are indispensable for studying particle and nuclear physics.
40PNP011**	Seminar on Quantum Field Theory 1	2	Seminars to learn basic knowledge and skills of quantum field theories required in theoretical investigations of particle and nuclear physics through exercises and reading important literature.
40PNP012**	Seminar on Quantum Field Theory 2	2	Seminars to learn basic knowledge and skills of quantum field theories required in theoretical investigations of particle and nuclear physics through exercises and reading important literature.
40PNP013**	Seminar on Elementary Theoretical Physics	2	Seminars to learn basic knowledge and skills of elementary physics required to start studies in theoretical particle and nuclear physics.
40PNP014**	Advanced Theoretical Cosmophysics	2	Lectures on theoretical cosmology related to the early Universe, high energy astrophysics and astro-particle physics.
40PNP015**	Seminar on Theoretical Cosmophysics	2	Seminars to learn basic knowledge and skills required in theoretical investigations of cosmophysics through exercises and reading important literature.
40PNP016**	Introduction to Elementary Particle Physics	2	Introductory lecture on Elementary Particle Physics focusing on Experimental Aspects.
40PNP017**	Introduction to Nuclear Physics	2	Introductory lecture on Nuclear Physics focusing on Experimental Aspects.
40PNP018**	Introduction to Experimental Cosmophysics	2	Lectures on cosmology focusing on observational/experimental aspects
40PNP019**	Colloquium I	1	Present your research, and through question-and-answer sessions and discussions, all participants will deepen their understanding of the research content. In parallel, acquire skills as an independent researcher, such as the ability to make presentations and the ability to communicate.
40PNP020**	Colloquium II	1	Present your research, and through question-and-answer sessions and discussions, all participants will deepen their understanding of the research content. In parallel, acquire skills as an independent researcher, such as the ability to make presentations and the ability to communicate.

## Particle and Nuclear Physics

Course Code	Course	Credit	Content of Subject
40PNP021**	Colloquium III	1	Present your research, and through question-and-answer sessions and discussions, all participants will deepen their understanding of the research content. In parallel, acquire skills as an independent researcher, such as the ability to make presentations and the ability to communicate.
40PNP022**	Colloquium IV	1	Present your research, and through question-and-answer sessions and discussions, all participants will deepen their understanding of the research content. In parallel, acquire skills as an independent researcher, such as the ability to make presentations and the ability to communicate.
40PNP023**	Advanced Course for Physics of Collider Experiments 1	2	Advanced lecture on Physics of Collider Experiments.
40PNP024**	Advanced Course for Physics of Collider Experiments 2	2	Advanced lecture on Physics of Collider Experiments.
40PNP025**	Seminar on Physics of Collider Experiments I	2	Advanced exercise for Physics of Collider Experiments.
40PNP026**	Seminar on Physics of Collider Experiments II	2	Advanced exercise for Physics of Collider Experiments.
40PNP027**	Advanced Course for Experimental Lepton Physics 1	2	Advanced lecture on Experimental Lepton Physics.
40PNP028**	Advanced Course for Experimental Lepton Physics 2	2	Advanced lecture on Experimental Lepton Physics.
40PNP029**	Seminar on Experimental Lepton Physics I	2	Advanced exercise for Experimental Lepton Physics.
40PNP030**	Seminar on Experimental Lepton Physics II	2	Advanced exercise for Experimental Lepton Physics.
40PNP031**	Advanced Course for Experimental Hadron & Nuclear Physics 1	2	Advanced lecture on Experimental Hadron & Nuclear Physics.
40PNP032**	Advanced Course for Experimental Hadron & Nuclear Physics 2	2	Advanced lecture on Experimental Hadron & Nuclear Physics.
40PNP033**	Seminar on Experimental Hadron & Nuclear Physics I	2	Advanced exercise for Experimental Hadron & Nuclear Physics.
40PNP034**	Seminar on Experimental Hadron & Nuclear Physics II	2	Advanced exercise for Experimental Hadron & Nuclear Physics.
40PNP035**	Advanced Course for Kaon and Neutron Physics 1	2	Advanced lecture on Kaon and Neutron Physics.
40PNP036**	Advanced Course for Kaon and Neutron Physics 2	2	Advanced lecture on Kaon and Neutron Physics.
40PNP037**	Seminar on Kaon and Neutron Physics I	2	Advanced exercise for Kaon and Neutron Physics.
40PNP038**	Seminar on Kaon and Neutron Physics II	2	Advanced exercise for Kaon and Neutron Physics.

## Particle and Nuclear Physics

Course Code	Course	Credit	Content of Subject
40PNP039**	Advanced Course for Experimental Cosmophysics 1	2	Advanced lecture on Experimental Cosmophysics.
40PNP040**	Advanced Course for Experimental Cosmophysics 2	2	Advanced lecture on Experimental Cosmophysics.
40PNP041**	Seminar on Experimental Cosmophysics I	2	Advanced exercise for Experimental Cosmophysics.
40PNP042**	Seminar on Experimental Cosmophysics II	2	Advanced exercise for Experimental Cosmophysics.
40PNP043**	Advanced Course for Instrumentations of High Energy Physics 1	2	Advanced lecture on Experimental Cosmophysics.
40PNP044**	Advanced Course for Instrumentations of High Energy Physics 2	2	Advanced lecture on Experimental Cosmophysics.
40PNP045**	Seminar on Instrumentations of High Energy Physics I	2	Advanced exercise for Experimental Cosmophysics.
40PNP046**	Seminar on Instrumentations of High Energy Physics II	2	Advanced exercise for Experimental Cosmophysics.
40PNP047**	Advanced Digital Circuit Design and Development for Measurement and Control Systems	1	Lecture and exercise on the structure of Xilinx's FPGA and the characteristics of dedicated functional blocks. Aim to reach the level of knowledge required in actual development.
40PNP048**	Advanced Contemporary Physics 1	2	Please refer to the Web Syllabus 2023
40PNP049**	Advanced Contemporary Physics 2	2	Please refer to the Web Syllabus 2023
40PNP050**	Superstring Theory 1	2	Basics and the formulations of supergravity, which appears as an effective theory of superstring theory, focusing on four-dimensional N=1 supergravity, which is interesting from the phenomenological viewpoint.
40PNP051**	Superstring Theory 2	2	Lectures on modern methods for obtaining non-perturbative effects (string duality, algebro-geometric methods, etc.) necessary for applying string theory to realistic model building.
40PNP052**	Exercise for Physics of Collider Experiments 1	2	Advanced exercise for Physics of Collider Experiments.
40PNP053**	Exercise for Physics of Collider Experiments 2	2	Advanced exercise for Physics of Collider Experiments.
40PNP054**	Exercise for Experimental Lepton Physics 1	2	Advanced exercise for Experimental Lepton Physics.
40PNP055**	Exercise for Experimental Lepton Physics 2	2	Advanced exercise for Experimental Lepton Physics.
40PNP056**	Exercise for Experimental Hadron & Nuclear Physics 1	2	Advanced exercise for Experimental Hadron & Nuclear Physics.

## Particle and Nuclear Physics

Course Code	Course	Credit	Content of Subject
40PNP057**	Exercise for Experimental Hadron & Nuclear Physics 2	2	Advanced exercise for Experimental Hadron & Nuclear Physics.
40PNP058**	Exercise for Kaon and Neutron Physics 1	2	Advanced exercise for Kaon and Neutron Physics.
40PNP059**	Exercise for Kaon and Neutron Physics 2	2	Advanced exercise for Kaon and Neutron Physics.
40PNP060**	Exercise for Experimental Cosmophysics 1	2	Advanced exercise for Experimental Cosmophysics.
40PNP061**	Exercise for Experimental Cosmophysics 2	2	Advanced exercise for Experimental Cosmophysics.
40PNP062**	Exercise for Instrumentations of High Energy Physics 1	2	Advanced exercise for Experimental Cosmophysics.
40PNP063**	Exercise for Instrumentations of High Energy Physics 2	2	Advanced exercise for Experimental Cosmophysics.
80PNP001**	Qualifying Research in Particle, Nuclear and Cosmo Physics IIA	2	Students are required to perform a research on an advanced subject in accelerator science.
80PNP002**	Qualifying Research in Particle, Nuclear and Cosmo Physics IIB	2	Students are required to perform a research on an advanced subject in accelerator science.

## Accelerator Science

Course Code	Course	Credit	Content of Subject
40COM001**	High Energy Accelerator Science Seminar 1	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40COM002**	High Energy Accelerator Science Seminar 2	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40ACS001**	Introduction to Accelerators 1	2	General introduction to accelerators in omnibus-style classes for specific fields by the experts and given in Japanese.
40ACS002**	Introduction to Accelerators 2	2	General introduction to accelerators in omnibus-style classes for specific fields by the experts and given in English.
40ACS003**	Seminar on Introduction to Accelerators 1	2	General introduction to accelerators in omnibus-style seminars and practicals for specific fields by the experts and given in Japanese.
40ACS004**	Seminar on Introduction to Accelerators 2	2	General introduction to accelerators in omnibus-style seminars and practicals for specific fields by the experts and given in English.
40ACS005**	Radiation Physics	2	This class is on the basic topics about generation of radiation ray and interaction of radiation and matter. 1. Structure of atom and ionization 2. Structure of nucleus 3. Decay of radioactive nucleus 4. Nuclear interaction 5. Interaction of x ray and gamma ray 6. Interaction of beta ray 7. Interaction of proton ray and alpha ray 8. Interaction of neutron 9. Transfer of energy to material 10. Quantity and unit of radiation ray.
40ACS006**	Fundamentals of electromagnetism for particle accelerators	2	Lectures on basics of electromagnetism necessary to understand accelerators will be given. Contents: Vector Analysis /Static electromagnetic field /Maxwell equations /Transmission of electromagnetic field /Waveguides and resonant cavities/Radiation from charged particles /Interaction between charged particles and material (electromagnetic field).
40ACS007**	Analytical Dynamics	2	In this lecture, single-particle dynamics in phase space will be discussed for understanding linear and nonlinear beam-phenomena in an accelerator.
40ACS008**	Foundations of Data Science	1	This course introduces the statistical processing for Big Data, Multivariate analysis, Machine Learning, in particular, the principles of Deep Learning and its application with exercise.



## Accelerator Science

Course Code	Course	Credit	Content of Subject
40ACS009**	Control of distributed devices for large systems	1	<p>EPICS (Experimental Physics and Industrial Control System) is a toolkit to monitor and control many devices, which are distributed over a wide area.</p> <p>At the beginning, EPICS was developed and used in an accelerator community.</p> <p>For example, KEK introduced EPICS into SuperKEKB and J-PARC accelerators.</p> <p>In addition, EPICS has been introduced in non-accelerator fields: telescopes, laser interferometers for gravitational-wave detections, and nuclear fusion facilities.</p> <p>Nowadays developments and maintenances of EPICS have been continued under a world-wide collaboration.</p> <p>In the class, introduction of EPICS will be given, followed by hands-on lessons with a tiny computer (Raspberry Pi). Students, who are expected to have knowledge of basic Linux commands, will study basic functions of EPICS by implementing EPICS and controlling remote I/O signals.</p>
40ACS010**	Practicum for accelerator science using the education-oriented electron linear accelerator	1	In this lecture, a practice and an exercise are performed based on the small-scale linear electron accelerator as the KEK Education and Training Accelerator (KETA).
40ACS011**	Machine Design	2	This course provides an introduction to mechanical design, material strength and machine components used in mechanical engineering for the design of accelerator devices.
40ACS012**	Introduction to Robotics	1	This course covers from sensors, actuators and other elements used in experimental equipment to the fundamentals of robotics.
40ACS013**	Beam Physics	2	Lectures and exercises will be given on the fundamentals of beam physics. The goal is to understand multipole expansion of electromagnetic field, equation of motion, transfer matrix, Twiss parameters, betatron oscillation, synchrotron oscillation, Courant-Snyder invariant, and beam injection.
40ACS014**	Particle Accelerator Design	2	Introductory lectures on the beam dynamics and primary knowledge for designing accelerators and the basic components for generation, acceleration, transportation, storage, collision, extraction, diagnostic, and control of their beams.

## Accelerator Science

Course Code	Course	Credit	Content of Subject
40ACS015**	Accelerator magnets and power supplies	2	In addition to the lecture on magnetic circuits, which are the basis of the magnet, their accelerator applications, and fabrication techniques, this course gives the lecture on power electronics circuits for magnet power supplies, which are the source of magnetic field generation. Finally, through practical training to learn the magnet system, this course aims at the acquisition of magnetic field measurement techniques to evaluate magnet performance, as well as alignment techniques.
40ACS016**	Introduction to Computational Science	2	The course aims to encourage learners to understand the fundamental concept of computer architecture and network communication. Learners will also study programming principles through the computational simulation/calculation program, which is required particularly for high-energy/nuclear physics. Two or more lecturers help learners with hands-on lessons throughout the course.
40ACS017**	Introduction to Radiation Detection and Measurement	2	Characteristics of various types of radiation (charged particles, photons, neutrons) and their interactions with matter. An introductory treatment of detection and measurement for radiation generating in accelerators which, nevertheless, extends to a detailed account of detector types, properties and functions.
40ACS018**	Introduction to Surface Analysis	2	Basic concepts, instruments, and characteristics of surface analysis techniques using electromagnetic waves and/or charged particles will be presented with their materials applications.
40ACS019**	Beam instrumentation basics	2	This course covers the principles of beam instrumentation, mainly using electrical method ranging from DC to the RF region. In the beginning, we emphasize signal processing techniques to be able to handle the beam signal in both time domain and frequency domain. Next, we study microwave engineering essentials which will be needed to understand real beam monitors. After studying the theory of the techniques, the principles of beam instrumentation widely used in circular accelerators will be reviewed by showing real beam monitors in accelerators at KEK.

## Accelerator Science

Course Code	Course	Credit	Content of Subject
40ACS020**	Introduction to accelerator control system	2	Introduction to the accelerator and beam control is provided. Design policies and actual implementations are explained with examples for accelerator control components such as computer system, control software, network system, input/output interface, timing system, machine-protection system, and personnel-protection system. A technique to improve the beam stabilities through the control system is also discussed.
40ACS021**	Superconducting technology and cryogenics engineering	2	Introduction to the accelerator and beam control is provided. Design policies and actual implementations are explained with examples for accelerator control components such as computer system, control software, network system, input/output interface, timing system, machine-protection system, and personnel-protection system. A technique to improve the beam stabilities through the control system is also discussed.
40ACS022**	Beam acceleration and RF systems	2	Experts in electron and proton acceleration give this lecture for a comprehensive understanding of normal-conducting radio frequency (RF) acceleration. Students will learn the impedance concept peculiar to RF waves, network-analyzing method using equivalent circuits, and RF acceleration systems used in recent beam accelerators. The system composed of a high-power source, three-dimensional transmission circuits with special waveguide elements and cavity resonators generating high electric fields is a treasure trove of various ideas and technologies. In addition to the theory and technical explanation, beam physics related to the RF acceleration such as beam-loading compensation, beam instability due to wake fields, its suppressing methods and improvement of beam dynamics by harmonic superposition will be developed.
40ACS023**	Vacuum science and technology for particle accelerators	2	Surface phenomena in accelerators, such as secondary electron emission, photodesorption and electrical breakdown in vacuum are described. Further, vacuum system design and pressure distribution calculation are to be studied.
40ACS024**	Particle Sources	2	Design of electron beam sources (electron guns) and related new developments, such as photocathode guns and rf guns.

## Accelerator Science

Course Code	Course	Credit	Content of Subject
40ACS025**	Advanced Course for Superconducting Cavities	2	Design principles, fabrication technology and operational aspect of superconducting cavities for light sources, colliding accelerators and other accelerators.
40ACS026**	Data Acquisition and Analysis Methods	2	This course covers the methodologies on on-line data acquisition and analysis techniques in High Energy Physics.
40ACS027**	High Performance Computing	2	The course covers the hardware/software techniques and applications for computers with high performance as compared to a general-purpose computer.
40ACS028**	Advanced Course for Radiation Shielding	2	Shielding methods and materials for various types of radiation in matter, shield design for radiation facilities. Radiation transport simulation.
40ACS029**	Advanced Course for Radiation Protection	2	Introduction of radiation effect on human health. Characteristics of radiation fields, mechanism of induced radioactivity and dose estimation for radiation protection at accelerator facilities.
40ACS030**	Advanced Computational Radiation physics	2	Students learn the basic techniques, and methods to provide numerical quantities of radiation simulation by Monte Carlo code.
40ACS031**	Practicum of Radiation Simulation by Monte Carlo Code	2	Students will install favorite Monte Carlo codes (EGS5, PHITS, or GEANT4) into their Laptop, learn the input and usage, run the code, and check the results for some theme.
40ACS032**	Advanced Course for superconducting magnets	2	Lectures on fundamentals, design and manufacturing of superconducting magnets for accelerators. Includes introduction to recent developments in magnetic technologies for compact accelerators and high field-strength magnets for energy-frontier machines.
40ACS033**	Computer Architecture	2	This course covers wide field of software engineering such as software development methodologies, computer languages and database.
40ACS034**	Computer Programming (C++ or Python)	2	This course covers techniques for programming and data analysis using C++ and Python.
40ACS035**	Computer Programming Laboratory	2	Learn about programming and data analysis using C++ and Python through hands-on exercises.
80ACS001**	Qualifying Research in High Energy Accelerator Science II A	2	Students are required to perform a research on an advanced subject in accelerator science.

**Accelerator Science**

Course Code	Course	Credit	Content of Subject
80ACS002**	Qualifying Research in High Energy Accelerator Science II B	2	Students are required to perform a research on an advanced subject in accelerator science.
80ACS003**	Special Exercise for Accelerator Science I A	2	Exercise on accelerator science.
80ACS004**	Special Exercise for Accelerator Science I B	2	Exercise on accelerator science.
80ACS005**	Special Exercise for Accelerator Science II A	2	Exercise on accelerator science.
80ACS006**	Special Exercise for Accelerator Science II B	2	Exercise on accelerator science.
20DACd01**	An Introduction to Electronics	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022

## Astronomical Science

Course Code	Course	Credit	Content of Subject
40ASS001**	Science Communication	2	Based on various examples of astronomy, the way of research outcomes to contribute to the public (public outreach) is lectured.
40ASS002**	Introduction to Observational Astronomy 1	2	We will give a contemporary view of the Universe, obtained from optical, infrared, and radio observations on stars, interstellar matter, galaxy and cluster of galaxies.
40ASS003**	Introduction to Observational Astronomy 2	2	Structure, origin and evolution of solar system bodies such as planets and satellites.
40ASS004**	Introduction to Theoretical Astronomy	2	We will discuss contemporary view of theoretical astronomy and astrophysics. Subjects include the structure and evolution of stars and galaxies, the origin of the planetary systems, and others.
40ASS005**	Introduction to Optical/Infrared Telescope	2	A principle of optical and infrared telescopes is presented as well as the basics of observation such as spectroscopy and photometry.
40ASS006**	Introduction to Optics	2	Basics of optics are lectured. Topics will be aberration, and the methods to evaluate a optical system.
40ASS007**	Introduction to Radio Telescope	2	Lecture on the principle of radio telescope, the design and production, and basics of its control.
40ASS008**	Introduction to Radio Observation System	2	Lecture on radio receivers, which includes low-temperature techniques and digital processing.
40ASS009**	Introduction to Radio Astronomy Instrumentation and Observations	2	Lecture on principles of various detectors and spectroscopic methods in radio observations.
40ASS010**	Introduction to Astronomical Instruments	2	Principles of observational instruments for various wavelengths are lectured from the physical basics.
40ASS011**	Training of Presentation in English	1	In order to facilitate presentations in international conferences, presentation techniques are trained by specialists in English conversation. This class emphasizes practice on how to present and how to prepare presentaion documents.
40ASS012**	Optical/Infrared Astronomy 1	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.
40ASS013**	Optical/Infrared Astronomy 2	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.
40ASS014**	Optical/Infrared Astronomy 3	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.
40ASS015**	Optical/Infrared Astronomy 4	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.
40ASS016**	Optical/Infrared Astronomy 5	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.
40ASS017**	Optical/Infrared Astronomy Seminar 1	2	Seminar on the optical/infrared astronomy.

## Astronomical Science

Course Code	Course	Credit	Content of Subject
40ASS018**	Optical/Infrared Astronomy Seminar 2	2	Seminar on the optical/infrared astronomy.
40ASS019**	Radio Astronomy 1	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.
40ASS020**	Radio Astronomy 2	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.
40ASS021**	Radio Astronomy 3	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.
40ASS022**	Radio Astronomy 4	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.
40ASS023**	Radio Astronomy 5	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.
40ASS024**	Radio Interferometry	2	Principle of radio interferometers, necessary observational technology and methods of data reduction are lectured.
40ASS025**	Radio Astronomy Seminar 1	2	Seminar on radio observation and its instruments.
40ASS026**	Radio Astronomy Seminar 2	2	Seminar on radio observation and its instruments.
40ASS027**	General Relativity	2	Lecture on the general relativity.
40ASS028**	Gravitational Dynamics	2	Lecture on basics of stellar dynamics (gravitational many-body problem and structure of galaxies) and celestial mechanics (planetary many-body problem and their orbital evolution).
40ASS029**	Solar System Astronomy	2	Spin motion and deformation of planets are lectured based on geophysical methods.
40ASS030**	Nuclear Astrophysics	2	The lecture aims to study the stellar evolution, supernova explosion and galactic chemical evolution based on understanding the elementary processes in these macroscopic phenomena in the universe.
40ASS031**	Solar/Stellar Physics	2	Interior structures of our sun and stars and their evolution are lectured.
40ASS032**	Cosmic Plasma Physics 1	2	Lecture on theoretical and/or observational aspects of surface activity and atmospheric structure of our sun and other stars.
40ASS033**	Cosmic Plasma Physics 2	2	Lecture on theoretical and/or observational aspects of surface activity and atmospheric structure of our sun and other stars.
40ASS034**	Astrophysics 1	2	Lecture on theoretical and observational aspects of astrophysical objects in various hierarchical levels, such as the evolution of the early universe, the formation and evolution of large-scale structure of the universe, galaxies, and stars, the interstellar medium, the formation of star and planetary systems.

## Astronomical Science

Course Code	Course	Credit	Content of Subject
40ASS035**	Astrophysics 2	2	Lecture on theoretical and observational aspects of astrophysical objects in various hierarchical levels, such as the evolution of the early universe, the formation and evolution of large-scale structure of the universe, galaxies, and stars, the interstellar medium, the formation of star and planetary systems.
40ASS036**	Astrophysics 3	2	Lecture on theoretical and observational aspects of astrophysical objects in various hierarchical levels, such as the evolution of the early universe, the formation and evolution of large-scale structure of the universe, galaxies, and stars, the interstellar medium, the formation of star and planetary systems.
40ASS037**	Astronomical Data Reduction	2	Lectures on astronomical data reduction, including image processing, data archive and related software.
40ASS038**	Statistics for Astronomy	2	The course introduces statistical methods of analyses that are necessary in interpreting data in various fields of astronomy. While astronomical applications are the goal, the course starts from the basics.
40ASS039**	Simulation Astronomy	2	Lecture on method of simulation for various researches of astronomy.
40ASS040**	Common Basic Astronomies Seminar 1	2	Seminar on database astronomy, solar/cosmic plasma, and theoretical astronomy.
40ASS041**	Common Basic Astronomies Seminar 2	2	Seminar on database astronomy, solar/cosmic plasma, and theoretical astronomy.
40ASS042**	Extrasolar planetary science	2	The course introduces observational and data-analysis methods used in exoplanet research, as well as its latest results.
40ASS043**	Planetary system formation	2	The course covers theoretical and observational studies of planetary system formation, starting from the basics but introducing the latest topics as well.
40ASS044**	Gravitational Wave Astronomy	2	Lecture on gravitational wave (GW) astronomy. GW theory is introduced. GW detectors and very recent GW detections (2015–2017) are presented.
40ASS045**	Basic Seminar 1	2	Seminar on basic astronomy textbooks.
40ASS046**	Basic Seminar 2	2	Seminar on basic astronomy textbooks.
40ASS047**	Basic Seminar 3	2	Seminar on basic astronomy textbooks.
40ASS048**	Basic Seminar 4	2	Seminar on basic astronomy textbooks.
40ASS049**	Basic Seminar 5	2	Seminar on basic astronomy textbooks.
40ASS050**	Basic Seminar 6	2	Seminar on basic astronomy textbooks.
40ASS051**	Interdisciplinary Research 1	4	Seminar on current progress of astronomical sciences (3rd and 4th years).
40ASS052**	Interdisciplinary Research 2	2	Seminar on current progress of astronomical sciences (4th year).



## Astronomical Science

Course Code	Course	Credit	Content of Subject
40ASS053**	Exercise in Scientific English	2	According to the achievement of respective students, small group exercise is given on the presentation in English, conversation and scientific writing.
40ASS054**	Observation Experiment 1	2	Experiment of observation at observatory.
40ASS055**	Observation Experiment 2	2	Experiment of observation at observatory.
40ASS056**	Optical/Infrared Observation Instruments	2	Principles of various detectors in optical and infrared observations are lectured.
40ASS057**	Radio Astronomy Special Lecture	2	Lecture on Very-Long-Baseline-Interferometer. Principles and methods of data reduction are lectured.
40ASS058**	Special Lecture 1	1	A specific research area of astronomy is overviewed.
40ASS059**	Special Lecture 2	1	A specific research area of astronomy is overviewed.
80ASS001**	Progress Report	6	This corresponds to a Master Thesis. Graduate students are asked also to have oral presentations.
80ASS002**	Colloquium I	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (1st year)
80ASS003**	Colloquium II	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (2nd year)
80ASS004**	Colloquium III	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (3rd year)
80ASS005**	Colloquium IV	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (4th year)
80ASS006**	Colloquium V	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (5th year)

## Fusion Science

Course Code	Course	Credit	Content of Subject
40FSS001**	Introduction to Project Management	1	Project is an individual or collaborative enterprise for achieving a particular aim. In order to complete the project within the deadline, tasks, the process, works, costs and risks should be carefully managed. This lecture provides the fundamental knowledge on the project management and examples of big projects in the world, so as to improve your ability for problem solution and management.
40FSS002**	Scientific English Writing and Presentation at International Conferences	2	Because international collaboration is often required for the successful development of magnetic fusion energy, as seen in the case of ITER, the ability of communication in English is a "prerequisite" to be a successful research scientist. A series of lectures will provide students with the basic knowledge to write and present technical papers in English for international conferences, also with practice in reading technical literature and a with a review of relevant grammatical topics.
40FSS003**	Fundamentals of Fusion Science	2	The lecture is an introduction to basic plasma physics and reactor system engineering for nuclear fusion describing the history and present status of the fusion research. The objective is to obtain the overall understanding of fusion science, introducing the most advanced issues in large plasma experiments, large-scale simulation studies, and reactor engineerings.
40FSS004**	Fundamentals of Plasma Experiment	2	The lecture focuses on error analysis in plasma diagnostics, emphasizing the use of mathematical statistics, specifically the normal distribution and the application of least-squares fitting.
40FSS005**	Exercise of scientific paper analysis	2	The aim of the lecture is to learn error analysis for allowing the scientists to estimate how large his uncertainties are, and to help him to reduce them when necessary. The basics of plasma diagnosis are reviewed. The error analysis based on the mathematical statistics and the least-squares fitting as its application are studied. The normal distribution and other important distributions are treated.

## Fusion Science

Course Code	Course	Credit	Content of Subject
40FSS006**	Basic exercise on physics and engineering 1	2	Lectures will provide students with the basic knowledge and techniques necessary to conduct experimental research on fusion plasmas. In the labs, students will learn the basic techniques for handling and designing vacuum equipment, measurement equipment, and high voltage and high current equipment.
40FSS007**	Basic exercise on physics and engineering 2	2	In this exercise program, the bases of the techniques for safe experiments: radiation handling, high pressure and cryogenic gas handling, and analyses of plasma facing materials, are given.
40FSS008**	Basic exercise on physics and engineering 3	2	This exercise gives basic knowledge such as data processing, programming, and applied mathematics for plasma physics researches.
40FSS009**	Basic digital circuit design and development for measurement and control systems	1	Basic digital circuit design and development for measurement and control systems
40FSS010**	Plasma Physics 1	2	Basic plasma physics will be covered; single particle motion, plasma as a fluid, plasma waves, diffusion and resistance. In addition, the concept of magnetic confinement fusion and recent fusion research are described.
40FSS011**	Plasma Physics 2	2	For the students who have completed Plasma Physics I, advanced contents of the fundamental physics in mainly the fusion plasmas behavior are explained. Both aspects of the microscopic particle property and the macroscopic fluid property are shown.
40FSS012**	Fusion System Engineering	2	This lecture provides an overview of the fusion system and its basic components, such as magnets, heating devices, and in-vessel components, including their requirements, functions, and future issues.
40FSS013**	Fusion plasma science seminar I A	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.

## Fusion Science

Course Code	Course	Credit	Content of Subject
40FSS014**	Fusion plasma science seminar I B	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS015**	Fusion plasma science seminar II A	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS016**	Fusion plasma science seminar II B	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS017**	Fusion plasma science seminar III A	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS018**	Fusion plasma science seminar III B	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS019**	Fusion plasma science seminar IV A	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.

## Fusion Science

Course Code	Course	Credit	Content of Subject
40FSS020**	Fusion plasma science seminar IVB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS021**	Fusion plasma science seminar VA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS022**	Fusion plasma science seminar VB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS023**	Advances in Plasma Science	2	The basic physics of plasma transport at the peripheral region and plasma-wall interaction in magnetically confined fusion devices are explained. In addition, the basics of atomic and molecular processes in plasmas and a collisional-radiative model for spectroscopic diagnostics are explained.
40FSS024**	Fusion Reactor Materials	2	Theories of elasticity, plasticity, strengthening and radiation damage of materials are reviewed. Tensile testing is lectured as a typical examination for materials. The operating environments of materials in ITER and future DEMO reactors are explained, in which typical candidate materials for both environments and requirements to be improved in the candidates, will be shown.
40FSS025**	Fundamentals of Simulation Science	2	Concepts, basic equations, algorithms, visualization analysis, characteristics and limitations of the models, and numerical errors are described for particle and fluid models commonly used in plasma simulations.
40FSS026**	Mathematical Physics	2	This lecture presents basic methods of mathematical physics used in Plasma Physics and Fusion Science. As examples of application, one learns plasma kinetic theory and the correspondence between particle ensembles and fluids.

## Fusion Science

Course Code	Course	Credit	Content of Subject
80FSS001**	Fusion plasma science investigation I A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS002**	Fusion plasma science investigation I B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS003**	Fusion plasma science investigation II A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS004**	Fusion plasma science investigation II B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS005**	Fusion plasma science investigation III A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS006**	Fusion plasma science investigation III B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS007**	Fusion plasma science investigation IV A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.

## Fusion Science

Course Code	Course	Credit	Content of Subject
80FSS008**	Fusion plasma science investigation IV B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS009**	Fusion plasma science investigation V A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS010**	Fusion plasma science investigation V B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS001**	Space Science	2	Reviews of the development of astrophysics and solar system sciences are given. Scientific issues are discussed and possible future plans are introduced. Methods of investigation using satellite, spacecraft and sounding rocket are also explained.
40SAS002**	Space Engineering	2	Technologies for space science, exploration, and utilization are overviewed. System design of launch vehicle and spacecraft, mission analysis of space systems, orbit control and determination, and project management are lectured by professional personnel in each field.
40SAS003**	Space and Astronautical Science	1	This online lecture (E-learning) provides an overview of the researches conducted in the Department of Space and Astronautical Science as an omnibus, which includes scientific subjects on astrophysics and solar system physics as well as engineering subjects on spacecrafts and rockets.
40SAS004**	Scientific writing 1	2	This class is to learn the scientific presentation and its practice in English mainly through exercises. This class starts with a short course in Japanese explicating "How to compose and write scientific articles". Lecture is given by a native English lecturer in addition to a Soken-dai Professor. (for students of English as a second language)
40SAS005**	Scientific writing 2	2	Learn the basics of writing academic papers in English mainly through exercises. Lecture is given by a native English lecturer in addition to a Soken-dai Professor. (for students of English as a second language)
40SAS006**	Introduction to Space Astronomy	2	This lecture gives an overview of the new view of the universe revealed by the observations in various wave bands. Observational technology is also reviewed with emphasis on that specific to the space missions. In the lecture, it is explained how various phenomena in the universe are understood based on the laws of physics, together with the telescope technology and the data analysis methods.



## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS007**	Introduction to Exploring the Solar System	2	The lecture treats origin and evolution of the planetary bodies and thier environment on a basis of the scientific results of recent planetary explorations, observation techniques, and the scientific instruments onboard spacecraft, focusing on the science of solarsystem small bodies and astrobiology considering both extrasolar planets and solar system.
40SAS008**	Introduction to Spacecraft Propulsion	2	The lecture describes theories and experimental methods on thermo-fluid engineering for space transportation system. It includes specific examples as well as basic technology.
40SAS009**	Introduction to Space Structures and Materials	2	The class focuses on the structure and the materials of spacecraft including flexible structure and deployable structure. The lecture describes their feature and provides the fundamental knowledge required in the design and development of spacecraft structure and materials.
40SAS010**	Introduction to electronics and information for space applications	2	The course includes onboard and ground telecommunication techonologies of spacecraft for understanding fundamentals of technologies supporting information society.
40SAS011**	Introduction to Radiowave Engineering for Space Applications	2	We can find many radiowave applications in spacecraft systems, for example, a rocket tracking, a R&RR for trajectry determination, GPS, remote sensing. The lecture gives principles, hardware and signal processings of radar systems. It includes latest informations of space radars and a laser ranging technology for spacecrafts.
40SAS012**	Computational engineering and science	2	Computational science based on the numerical simulation technologies stands with theory and experiments, being an important research and developping tool in the ace science field. This lecture introduces the leading edge technologies in numerical simulation, data assimilation, data visualization and high performance computing which support them and related technologies especially from the engineering perspective. Also the high performance computing and related topics, which support computational engineering and science are introduced.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS013**	Space Observation Science	2	Fundamental methods of mission analysis and design for space-science experiments are lectured from the understanding of background physics and its methods.
40SAS014**	Space Systems Engineering 1	2	Basic theories, technologies and project management of the space system including the satellites and the scientific balloons will be lectured, and their applications, current subjects and future prospects will be discussed.
40SAS015**	Space Systems Engineering 2	2	The rocket systems engineering associated with launch and reentry of space vehicles is thoroughly lectured. Flight dynamics, guidance and control, thermal protection, and recovery systems etc. are reviewed in some detail. The lecture is extended to entry systems for planetary missions. Special topics involving system design processes, applications and future prospects are also discussed.
40SAS016**	Space Systems Engineering 3	2	The orbit calculation and the orbit design/determination of solar system bodies and man-made space probes (artificial satellites and spacecraft) are lectured. Various dynamical features are known for solar system bodies. The origins of such features and the methods of analysis will be discussed. As for the man-made space probes, the basic knowledge and methods for the orbit planning/determination will be discussed.
40SAS017**	Space Systems Engineering 4	2	Space power systems and subsystems including power generation, storage, transmission, and management are lectured. The lecture covers basic and advanced power technologies, and future space energy systems for Solar Power Satellite and planetary exploration mission.
40SAS018**	Space Environment Physics	2	High-energy plasma phenomena in the solar corona, such as flares and coronal mass ejections (CMEs), affect the space environment of the solar system. The lecture reviews observational aspects and mechanisms of such high-energy phenomena in the solar atmosphere, and discusses their effects on the near-Earth space environment.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS019**	Space Astronomy 1	2	Give a lecture on various high-energy phenomena revealed through X-ray and Gamma-ray observations from satellites, and study the background physics behind the phenomena. Also given is a lecture on the principle and the actual configuration of X-ray and Gamma-ray instruments and the analysis methods of their data.
40SAS020**	Space Astronomy 2	2	The lecture gives an overview of the recent picture of the Universe, especially the early Universe, the large scale structure, and formation and evolution of galaxies, stars, and planets, which have been revealed by infrared and submillimeter observations from space. Also gives brief descriptions of detection principle of infrared light from space, and the unique techniques used in the observational instrumentation and the data analysis.
40SAS021**	Space Astronomy 3	2	The lecture gives radio astronomy observations from satellites, especially space-VLBI observations and its results. The lecture also includes basics of the radio interferometry and ground interferometers and its results to understand the space-VLBI observation.
40SAS022**	Science of Planetary Exploration	2	The lecture gives an introduction of the area of solid planetary science, Especially, we discuss the practical methods of investigation of the surface and the internal structure of the solid planets by the space exploration. The goal of this lecture is to understand how the obtained data are related to the origin and evolution of the planets.
40SAS023**	Physics of Planetary Atmospheres	2	The lecture gives the basic physics of planetary atmospheres and the overview of atmospheric structures and physical processes observed so far. Unsolved problems to be addressed in future spacecraft missions will also be discussed.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS024**	Solar System Plasma Physics	2	The solar system is a laboratory where dynamics of energetic plasma in the universe can be studied in situ by state-of-the-art instruments on board spacecraft. This lecture provides basic knowledge of physical processes occurring in the plasma environment of the solar system, including the solar wind, ionospheres, and magnetospheres around the planets. Scientific objectives of space missions both for magnetized and unmagnetized planets are described, with the reference to the innovative techniques for the plasma measurements in space.
40SAS025**	Spacecraft Propulsion	2	Starting from the basic concepts of both chemical and advanced propulsion systems, practical application of these concepts to space transportations and space probes are provided. Topics include state-of-the-art rocket motors, air breathing engines, propulsive method for orbital transfer vehicles, as well as in-space electric and other advanced propulsion systems.
40SAS026**	Space Structures and Materials	2	The lecture gives patterns, design methods, component materials, and on-board mechanisms of structures for spacecraft and rockets.
40SAS027**	Space Applied Physical Chemistry	2	The purpose of the lecture is to deepen the knowledge of materials which have been used for the spacecraft from the aspect of chemistry. With the basic lecture of chemistry, the fuel cell, oxygen generator, CO <sub>2</sub> removal/reduction, the film material, chemical propellant and other materials will be described from the view point of chemistry. The malfunctions of the spacecraft caused by the chemical reaction will also be discussed. Furthermore, the special material chemistry using the special space environment like microgravity conditions is also described as the future aspects of chemistry and material engineering. The background of the thermodynamics and thermochemistry will also be discussed.
40SAS028**	Electronics and information for space applications 1	2	The lecture gives basic circuit design and semiconductor device technologies with special emphasis on scientific foundations locating underneath the technologies. Further, RF circuits and small antennas for space communication are introduced. Special interest is put on characteristic measurement of high-power and low-noise circuits in a far-distance of deep space are discussed.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
40SAS029**	Electronics and information for space applications 2	2	<ul style="list-style-type: none"> <li>– The lecture gives the methods of attitude determination, attitude control, navigation and guidance of spacecraft, including sensors and actuators technologies.</li> <li>– This lecture also summarizes the technologies used in space exploration robots, and discusses how to design and build robots which explore the various surfaces of celestial bodies in the solar system.</li> <li>– Hands-on practice of software implementation of a simple system including sensor data processing, actuator commanding, and hardware control.</li> </ul>
40SAS030**	Space Life Science	2	In this lecture, we mainly explain how humans live in space and life in the extreme environment. The former describes the basic laws of the universe, space experiments using the space environment, the history of space exploration, space elevators, terraforming, space agriculture, exoplanets, and so on. The latter describes the basic environmental microbiological findings that lead to life exploration and astrobiology research such as the constituent molecules of life, the microbial energy metabolism, the habitat of life, and the origin of life. And the analytical technology and the latest research trends will be described.
40SAS031**	Materials Engineering in Space	2	This program explains the materials science research under the microgravity offered by orbital space platforms where buoyancy convections are fully suppressed and containerless conditions (levitation-positioning) can be easily obtained. Previous experiments, including their research facilities and experimental techniques, are also described. For containerless processing, electrostatic levitation techniques and related studies that include thermophysical property measurements and synthesis of metastable materials will be discussed in details. In addition, research in crystal growth mechanism and production of high quality crystals of semiconductor in microgravity are introduced.
40SAS032**	Field works	2	The credit of the field work is given to students for external studies which is planned voluntary and is carried over a total period longer than 2 weeks. The credit is given through examination based on the plan and resulting report by course committee members.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
80SAS001**	Space science colloquium I A	2	Through the studies in semiregular colloquia, etc., students acquire basic knowledge of the space science related to their research fields.
80SAS002**	Space science colloquium I B	2	Through the studies in semiregular colloquia, etc., students acquire basic knowledge of the space science related to their research fields and start learning advanced papers related to their research.
80SAS003**	Space science colloquium II A	2	Through the studies in semiregular colloquia, etc., students learn the advanced papers relevant to their research topics.
80SAS004**	Space science colloquium II B	2	Through the studies in semiregular colloquia, etc., students learn the basis to describe the research results logically and theoretically, with the completion in "Thesis Progress Report I" in mind.
80SAS005**	Space science colloquium III A	2	Through the studies in semiregular colloquia, etc., students set the discussion topic voluntarily and lead the discussion.
80SAS006**	Space science colloquium III B	2	Through the studies in semiregular colloquia, etc., students set the discussion topic voluntarily and lead the discussion. Students also acquire the discussion technique aiming the presentation within/outside Japan.
80SAS007**	Space science colloquium IV A	2	Through the studies in semiregular colloquia, etc., students present research results related to their PhD thesis and explore the related literature.
80SAS008**	Space science colloquium IV B	2	Through the studies in semiregular seminars, etc., students present research results related to their PhD thesis and summarize the explored literature.
80SAS009**	Space science colloquium VA	2	Through the studies in semiregular colloquia, etc., students understand the academic significance of their research in the relevant fields and in the society. Students also participate in seminars, meetings and symposia in preparation for the external reviews of their thesis.

## Space and Astronautical Science

Course Code	Course	Credit	Content of Subject
80SAS010**	Space science colloquium VB	2	Students conduct comprehensive studies through colloquia, which aim to overlook the academic background of the research and to clarify the significance of the research results, when they write the PhD thesis. Students also evaluate objectively the possibilities of their results or data to be related to general society and industry, and the merit of their results or data as intellectual property.
80SAS011**	Thesis Progress Report 1	2	Students in the 2nd year of the 5-year course summarize their research conducted in the 1st and 2nd years in a paper, and make an oral presentation
80SAS012**	Thesis Progress Report 2	2	Students in the 4th year of the 5-year course and in the 2nd year of the 3-year course summarize an interim report on their research conducted for the PhD thesis, and make an oral presentation.

## Molecular Science

Course Code	Course	Credit	Content of Subject
40COM003**	Practical Spoken English 1	1	The course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM004**	Practical Spoken English 2	1	Following "Practical Spoken English 1", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM005**	Practical Spoken English 3	1	Following "Practical Spoken English 2", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM006**	Practical Spoken English 4	1	Following "Practical Spoken English 3", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM007**	Practical Spoken English 5	1	Following "Practical Spoken English 4", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM008**	Practical Spoken English 6	1	Following "Practical Spoken English 5", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM009**	Practical Spoken English 7	1	Following "Practical Spoken English 6", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM010**	Practical Spoken English 8	1	Following "Practical Spoken English 7", the course focuses on improving and building the communication and presentation skills necessary for researchers.



## Molecular Science

Course Code	Course	Credit	Content of Subject
40COM011**	Practical Spoken English 9	1	Following "Practical Spoken English 8", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM012**	Practical Spoken English 10	1	Following "Practical Spoken English 9", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40MLS001**	Biomolecular Simulation	1	Basic theories and computational methods for molecular simulations for biomolecules will be introduced. For example, basic and various advanced methodologies for molecular simulations as well as fundamentals of analytical mechanics and statistical mechanics will be lectured.
40MLS002**	Fundamental Chemistry and Physics of Solids	2	To understand fundamental physical properties of solid materials, basic principles concerning solid state physics will be discussed. Structures, thermal properties, electronic structures, transport properties, magnetism, and superconductivity of solids will be introduced.
40MLS003**	Fundamentals of Biomolecular Science	2	Core aspects of biophysical chemistry will be overviewed with the life-science student in mind. This course aims at cultivating the fundamentals necessary to complete the advanced courses of Structural Biomolecular Science and of Functional Biomolecular Science. The lectures will be given with life-science examples using a textbook covering the laws of thermodynamics, biological standard state, chemical equilibrium and its temperature dependence, chemical kinetics, enzyme kinetics, and molecular dynamics.
40MLS004**	Introduction to Coordination Chemistry	2	Structure and bonding of transition metal complexes including organometallic complexes, with emphasis on electronic structures, spectroscopy, and elementary reactions.
40MLS005**	Fundamental Electronic Physics	2	Lecture on characteristics of crystal and electronic structures for solid-state materials. The methods of X-ray diffraction, vacuum UV spectroscopy and other related techniques using synchrotron radiation are introduced.

## Molecular Science

Course Code	Course	Credit	Content of Subject
40MLS006**	Synchrotron radiation science	2	<p>Synchrotron radiation is an important tool for elucidating the electronic and atomic structures that govern the properties and functions of matter.</p> <p>In the first half, we will give a lecture on electromagnetic radiation generation from relativistic electron beams (synchrotron radiation) and basic knowledge of optics. In the second half, we will summarize the interaction between light and matter, and outline the basic technology and application development of physical property analysis methods (photoelectron spectroscopy, X-ray absorption spectroscopy, etc.) using synchrotron radiation.</p> <p>A tour of UVSOR will also be conducted.</p>
40MLS007**	Fundamental Physical Chemistry 1	2	<p>This course gives an introductory overview of fundamental theories of quantum chemistry and statistical mechanics. A special emphasis is placed on understanding basic ideas of electronic structure theories of molecular properties and of static and dynamics properties in (non) equilibrium state.</p>
40MLS008**	Fundamental Physical Chemistry 2	2	<p>This course gives an introductory overview of fundamental theories in physical chemistry with a focus on quantum mechanics and statistical mechanics. A special emphasis is placed on the fundamental understanding of dynamical processes in molecular systems and light-matter interaction.</p>
40MLS009**	Fundamental Photo-science	2	<p>Photoexcitation and photoionization processes can provide detailed information on the molecular properties and are in widespread use of the physical and chemical sciences. This lecture provides the student with a firm grounding in the basic principles and experimental techniques employed. Use of case studies illustrates how photoabsorption and photoelectron spectra are assigned and how information can be extracted.</p>

## Molecular Science

Course Code	Course	Credit	Content of Subject
40MLS010**	Structural Photo-Molecular Science	2	The basic frameworks of various spectroscopic methods such as laser spectroscopy, nonlinear and time-resolved spectroscopy and microscopic methods, for investigation of structures and dynamics of small molecules to molecular assemblies are overviewed. Examples of applications of those methods for understanding/control of materials functionalities are also introduced.
40MLS011**	Materials Chemistry	2	The basic concept of structure-property relationship in organic/inorganic chemistry, materials chemistry, and solid-state physics and relevant experimental methods are overviewed. Actual examples of structural analysis, physical property measurement, and elucidation of functional activation mechanisms based on spectroscopic and surface science methods are also introduced.
40MLS012**	Structural Biomolecular Science	2	The molecular mechanisms of various biological processes will be lectured in this course. Especially, the molecular mechanisms of the following topics will be provided: Structure and function of proteins, DNA replication, transcription and translation of DNA, cellular homeostasis, biological energy conversion such as respiration and photosynthesis, biological metabolism and some recent research topics.
40MLS013**	Complex Catalysis	2	Molecular structures and functions of complex catalysts will be overviewed based on the understanding the features of transition metal catalysis, Lewis acid-Lewis base catalysis, and organo catalysis in catalytic molecular transformations.

## Molecular Science

Course Code	Course	Credit	Content of Subject
40MLS014**	Functional Biomolecular Science	2	1. Basic and applications of solution and solid-state NMR spectroscopy in structural analyses of biomolecules 2. Basic of microscopy, Single-molecule imaging, Optical tweezers, Magnetic tweezers, Super resolution microscopy, High-speed atomic force microscopy 3. Functional mechanisms of biomacromolecules including glycoproteins, membrane proteins, and multidomain proteins, Working mechanisms of motor proteins, Molecular basis of protein assembly
40MLS015**	Quantum dynamics	2	Lecture on principles of direct observation and control of ultrafast quantum dynamics of matter (in femto- and attosecond time scale) by using light and recent experimental trials in the relevant field.
40MLS016**	Molecular Functional Materials	2	Omnibus lectures on the functions and physical properties of organic molecules, molecular assemblies, and inorganic materials will be given.
80MLS001**	Seminar on Molecular Science IA	2	In seminars held by the research team to which the student belongs, the student will acquire basic knowledge of molecular science by taking a series of lectures on papers related to his/her own research project and participating in seminars to discuss the results of his/her research.

## Molecular Science

Course Code	Course	Credit	Content of Subject
80MLS002**	Seminar on Molecular Science I B	2	In seminars held by the research team to which the student belongs, the student will read papers related to his/her own research topics and present his/her research results, thereby learning how to interpret data rationally and how to make logical arguments based on the interpretation of data.
80MLS003**	Seminar on Molecular Science IIA	2	In seminars held by the research team to which the student belongs, the student will understand the level of achievement of his/her own research by studying advanced papers related to his/her research topics. In addition, the student will learn the basics of English presentation by presenting his/her research results in English in the seminars.
80MLS004**	Seminar on Molecular Science II B	2	In seminars held by the research team to which the student belongs, the student will prepare his/her interim report, through which he/she will learn the basics of describing research results logically.
80MLS005**	Seminar on Molecular Science IIIA	2	In the seminars of the research team to which the student belongs, the student will set and discuss issues on his/her own initiative. The student will deepen his/her discussions in preparation for conference presentations.

## Molecular Science

Course Code	Course	Credit	Content of Subject
80MLS006**	Seminar on Molecular Science III B	2	In the seminar of the research team to which the student belongs, the student will study papers related to the research topic comprehensively and systematically so that the student can obtain international recognition for his/her research results.
80MLS007**	Seminar on Molecular Science IVA	2	In the seminar of the research team to which the student belongs, the student considers the future development of his/her own research results and proposes upgrading/extension of the research.
80MLS008**	Seminar on Molecular Science IVB	2	In the seminar of the research team to which the student belongs, the student will be required to propose a novel research project with a view to developing his/her own research results into an unexplored research area.
80MLS009**	Seminar on Molecular Science VA	2	In the seminar of the research team to which the student belongs, the student will gain a bird's-eye view of his/her own research results and understand their academic and social significance. The student will be expected to actively engage in discussions with related researchers.

**Molecular Science**

Course Code	Course	Credit	Content of Subject
80MLS010**	Seminar on Molecular Science VB	2	<p>In the seminar of the research team to which the student belongs, with the aim to prepare his/her PhD thesis, the student will summarize the scientific background of his/her own research, clarify the significance of his/her own research results, and proactively conduct a general seminar.</p> <p>The value of the research results as intellectual property will be discussed in consideration of their application and development.</p>

## Materials Structure Science

Course Code	Course	Credit	Content of Subject
40COM001**	High Energy Accelerator Science Seminar 1	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40COM002**	High Energy Accelerator Science Seminar 2	2	Active fields of accelerator related science, such as elementary particles, nuclear physics, materials science and life science etc., will be presented by front-line researchers.
40MSS001**	Basis and application of synchrotron radiation	1	This course provides an overview of basis and application of synchrotron radiation, such as synchrotron light source, beamline technology, X-ray absorption spectroscopy (XAS), X-ray absorption fine structure (XAFS), magnetic circular dichroism (MCD), X-ray photoelectron spectroscopy (XPS), angle-resolved photoemission spectroscopy (ARPES), X-ray imaging, and scanning transmission X-ray microscope/microscopy (STXM).
40MSS002**	Introduction to Symmetry and Space group	2	The training course aims at providing a solid background in symmetry and group theory using various materials structures. Participants are requested to actively take part in solving the proposed exercises.
40MSS003**	X-ray Absorption Spectroscopy for Materials and Chemistry	2	Lectures on x-ray absorption and x-ray fluorescent spectroscopies (XAFS, XRF) for materials and chemistry.
40MSS004**	Introduction to the Condensed Matter Physics	2	Fundamental concepts for the understanding of condensed matter are presented with an introduction to the microscopic probes including synchrotron radiation, neutron and muon as tools for the study of electronic property.
40MSS005**	Molecular Biology 1	2	Lectures on molecular biology from genes to cells, which is based on modern biology.
40MSS006**	Molecular Biology 2	2	Lectures on molecular biology from genes to cells, which is based on modern biology.
40MSS007**	Introduction to Neutron Science 1	2	Lectures on neutron science for materials, and advanced techniques for neutron production, transportation, detection and instrumentation.
40MSS008**	Introduction to Neutron Science 2	2	Lectures on neutron science for materials, and advanced techniques for neutron production, transportation, detection and instrumentation.
40MSS009**	Dynamic Aspects of Materials Structure	2	Lectures on dynamic aspects of materials structure revealed by utilizing pulsed nature of SR.
40MSS010**	X-ray Imaging Optics	2	Lectures on the principle, the technique and applications of x-ray imaging optics using synchrotron radiation.



## Materials Structure Science

Course Code	Course	Credit	Content of Subject
40MSS011**	Synchrotron Radiation Surface Spectroscopy 1	2	Lectures on the principle of surface chemistry using synchrotron radiation and its applications.
40MSS012**	Synchrotron Radiation Surface Spectroscopy 2	2	Lectures on the basics of soft X-ray spectroscopy with a diffraction grating and its application to atomic and electronic structure analyses of surface.
40MSS013**	Introduction to Biology	2	Basic concepts of modern biology including biochemistry, molecular biology and cell biology with particular attention to structural biology.
40MSS014**	Structure Biology 1	2	Lectures on synchrotron X-ray crystallographic analysis of bio-macromolecules.
40MSS015**	Structure Biology 2	2	Lectures on synchrotron X-ray crystallographic analysis of bio-macromolecules.
40MSS016**	Muon-probed condensed matter physics	2	Applications of muon spin rotation, relaxation, resonance to the studies of magnetism and hydrogen-related phenomena is lectured.
40MSS017**	Medical Application of Synchrotron Radiation	2	Lectures on the principle and applications of medical imaging and radiation therapy using synchrotron radiation and the outline concerning medical ethics.
40MSS018**	Soft Condensed Matter Physics	2	Properties of soft condensed matters such as polymers, liquid crystals, colloids, and amphiphilic molecules will be explained from the viewpoint of physics.
80MSS001**	Qualifying Research in High Energy Accelerator Science IIA	2	Students are required to perform a research on an advanced subject in accelerator science.
80MSS002**	Qualifying Research in High Energy Accelerator Science IIB	2	Students are required to perform a research on an advanced subject in accelerator science.
80MSS003**	Special Exercise for Materials Structure Science IA	2	Seminars and laboratory exercise to understand the principle and techniques in Materials Structure Science through extensive use of KEK facilities.
80MSS004**	Special Exercise for Materials Structure Science IB	2	Seminars and laboratory exercise to understand the principle and techniques in Materials Structure Science through extensive use of KEK facilities.
80MSS005**	Special Exercise for Materials Structure Science IIA	2	Seminars and laboratory exercise to understand the principle and techniques in Materials Structure Science through extensive use of KEK facilities.
80MSS006**	Special Exercise for Materials Structure Science IIB	2	Seminars and laboratory exercise to understand the principle and techniques in Materials Structure Science through extensive use of KEK facilities.

## Global Environmental Studies

Course Code	Course	Credit	Content of Subject
40GES001**	Introduction to Global Environmental Studies	2	In order to tackle the core of global environmental problems such as “drastic reduction of greenhouse gas emissions” and “realization of a decarbonized society in the latter half of this century,” it has been demanded to have the interdisciplinary perspective that transcends the boundaries of conventional academic fields and to take the transdisciplinary approach that aims for a collaborative problem solution among diverse stakeholders including not only researchers but also citizens, governments, and businesses. “Global Environmental Studies” is not only to systemically establish such perspectives and methodologies and categorizing and numeralize the mutual interaction of humanity and nature, but also to understand them comprehensively. This course is designed to help students understand and acquire this “comprehensive knowledge” and is taught by faculty members, giving a series of lectures with specific examples of their own research.
40GES002**	Topics of Global Environmental Studies	2	Global environmental problems emerge as problems for society to solve when the interaction between human society and the natural environment becomes dysfunctional. The factors of the problem are complex and intertwined and may be difficult to solve. In such cases, it is necessary to recognize the problem from multiple perspectives from both the humanities/social sciences and natural sciences, and then to collaborate with various actors in society, including government, business, and residents to create solutions to the problem. In this omnibus lecture series, faculty members will give lectures on research methods for recognizing global environmental problems and co-creating solutions, using specific examples of their own research.
40GES003**	Introduction to Transdisciplinary Approach	1	Contemporary environmental problems such as climate change, natural disasters, infectious diseases, and wild animal attacks are challenging because of the complex intertwining of global and regional issues that span national borders and industries. In such cases, it is necessary for diverse actors from industries, academia, governments, and the private sectors to co-create solutions through dialogue that transcends their respective social positions and implement them in society. In this course, students will learn how to co-create solutions to problems based on dialogue among multiple actors through practice at a co-creative conference.
40GES004**	Global Environmental Studies Seminar III	1	Global environmental problems involve diverse temporal and spatial scales and complex causal relationships. Toward their solution academic research generally is conducted under diverse approaches and goals. In this course, we aim to introduce examples of past research efforts, to learn about the breadth of these approaches, and to find common threads among them on one's own. In this course, 8 lectures will be held in total and in each lecture, we will focus on a research project conducted at RIHN as a case study. The project leader will introduce the problem structure and aims of the research project, and then share the academic achievements and remaining future issues based on empirical data. (8 lectures)

## Global Environmental Studies

Course Code	Course	Credit	Content of Subject
40GES005**	Global Environmental Studies Seminar IV	1	This course is not offered in FY2024.
40GES006**	Global Environmental Studies Seminar V	1	This course is not offered in FY2024.
40GES007**	Global Sustainability Seminar	1	In this course, students will participate in meetings of young researchers or present a poster at international conferences which will be determined in consultation with the instructor in charge. Prior to participation in the conference, students will prepare application documents or a poster through individual guidance by the instructor in charge or through small-group seminars.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS001**	Introduction to Polar Multidisciplinary Science	1	In this class, we will give lectures from multiple perspectives on the history, present state, and future prospects of scientific observations that Japan is advancing in the Antarctic and Arctic regions, including scientific research, logistics aspects, environmental protection perspectives, and relationships with social life, and introduce the overall picture and attractiveness of multidisciplinary science conducted in the unique field of the polar region.
40PLS002**	Introduction to Advanced Earth Science 1	2	Topics from each research discipline are studied with special interest of international circumstances.
40PLS003**	Introduction to Advanced Earth Science 2	2	Topics from each research discipline are studied with special interest of international circumstances.
40PLS004**	Introduction to Earth's Metrology	2	To assess the natural environment of the polar regions, various means of geophysical observation are necessary, most notably remote sensing techniques using artificial satellites. It is also very useful to know how, over the long course of human history, people managed to measure such things as time, geographical location, distance on the Earth's surface, and how developed devices enabling these to be measured with enhanced precision. This subject explores the history of various kinds of geophysical measurement and discusses the current technological status and future developments.
40PLS005**	Polar Data Analysis	2	This course covers the basics of statistics, also known as the grammar of science, and provides lectures and practical training in data acquisition and analysis using examples of space environment measurements and analysis.
40PLS006**	Marine Ecology	2	The world ocean covers approximately 70% of the earth's surface and has an average depth of about 3,800 m. The Ocean provide a vast living space for marine life. This subject explores various types of marine environmental systems, in particular through the biological processes associated with plankton community of the pelagic ecosystem. Sampling and observation of marine organisms at sea will be carried out as a field course.
40PLS007**	Introduction to the atmospheric and hydrospheric sciences	2	This subject is designed to provide a geophysical and geochemical outline of phenomena occurring in the atmosphere, cryosphere, and ocean of the Earth for the integrated understanding of the processes in the polar regions.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS008**	Experimental Planetary Sciences	2	We systematically learn the experimental approaches and the obtained results for science on planetary materials to understand the characteristics of extraterrestrial materials and their formation and evolution, which will help us deeply understand the history of our solar system. The lectures will mainly treat the following topics: Basis of meteoritics, Antarctic meteorites, Antarctic micrometeorites, petrological and mineralogical method, crystallographic method, geochemical method, spectroscopic method, and mathematical method for examining the planetary materials. Based on these methods, we will study the primary evolution of planetary materials and metamorphism on the parent body.
40PLS009**	Behavioural Analysis of Marine Animals	2	This subject outlines the fundamentals of behavioural data analysis for marine animals. It overviews the behavioural measurement of marine animals, especially the biologging techniques, and basics of behavioural data analyses. Students also pursue practical exercises of using biologging techniques and analyzing the body acceleration and movement trajectories of marine animals.
40PLS010**	Physiological Ecology of polar photosynthetic organisms	2	This subject outlines the characteristics of polar environments in terms of biological adaptation to the environment, particularly physiological adaptation of aquatic microorganisms and flora. In addition, it provides practical training in the measurement of photosynthesis and other physiological activities and in techniques for outdoor research.
40PLS011**	Data Analysis for Ocean Remote Sensing	2	This subject explains from fundamentals of satellite remote sensing to their applications, covering the technical aspects of onboard satellite sensors and sensor operation methods. Also outlined are how to acquire ocean remote sensing data collected by earth observing satellites for studying polar ocean sciences and how to process them with computer application packages through lectures and training. It will introduce application examples in marine biological researches in polar areas.
40PLS012**	Magnetospheric Physics	2	The Earth's magnetosphere is made up of regions with various characteristics, and it changes dynamically due to the effects of solar wind and the Earth's atmosphere. This subject is designed to provide general knowledge about the structure of the magnetosphere and the various phenomena that arise within it.
40PLS013**	Cosmic Electrodynamics	2	This lecture covers the electromagnetism of the cosmos, i.e. the large-scale magnetic fields that are transported bodily in the swirling plasma throughout the universe. The motion of charged particles and some basic characteristics are also derived in some special magnetic field configurations such as dipole and shocks.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS014**	Radar Aeronomy	2	This subject covers the principles of radar observation for surveying the middle atmosphere, thermosphere and ionosphere, as well as the physics of neutral and ionized atmospheres as revealed by such radar observations. IS radar, HF radar, MF radar, meteor radar and MST radar are specifically described.
40PLS015**	Auroral Physics	2	Aurora is a bright enough natural emission as captured by naked eyes, which is caused by massive electron precipitation into the polar atmosphere, as a result of the interaction between the solar wind and terrestrial magnetism. This lecture covers the fundamntal mechanism and the predictability of a compound system of the solar wind, magnetosphere, and ionosphere, which is manifested in the shape, motion, and colors of aurora.
40PLS016**	Polar Plasma Wave Theory	2	In the ionosphere and magnetosphere of the polar regions, as well as in the solar winds that blow through interplanetary space, plasma waves of various modes are dynamically and repeatedly formed, propagated and extinguished. These waves play an essential role in regulating the physical characteristics and mass balance of each of these regions. This subject covers the basic characteristics of magnetohydrodynamic waves, electrostatic plasma waves and electromagnetic waves, as observed in geospace (the region of space near Earth), as well as methods of observing these waves.
40PLS017**	Aeronomy	2	Our understanding of the structure and variation of the Earth's atmosphere as it extends from the surface of the earth to the outer reaches of the solar system has grown dramatically. Whereas observation was previously limited to geomagnetic observation at the Earth's surface and spectroscopic observation from the ground, advances in recent years have made possible remote sensing from spacecraft and from the ground, as well as direct and indirect measurements from satellites. This subject offers an overview of our current understanding of the structure of the Earth's atmosphere and various physical processes based on geoelectromagnetic phenomena.
40PLS018**	Ionospheric physics	2	Charged particles in the ionosphere are affected by numerous physical and chemical processes, including plasma instabilities, diffusion, and transportation via electric and magnetic fields. In this lecture, students learn the basic processes occurring in the ionosphere, and also generation mechanisms of several ionospheric phenomena.
40PLS019**	Fundamental physics on the upper-atmospheric waves	2	This subject systematically covers the fundamentals of aeronomic waves, along with atmospheric gravity waves, tidal waves and planetary waves, as well as the propagation, wave-mean flow interaction and observation of such waves.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS020**	Introduction of upper atmosphere physics	2	The polar region is called the window of space, because the inflow, transport, accumulation, and consumption of solar wind energy are remarkably seen in the region, as typified by the aurora borealis. This lecture will give an overview of the various physical phenomena observed in this polar region from the viewpoint of the solar-terrestrial system.
40PLS021**	Introduction to Polar climate system	2	The formation of polar climates and their role in global climate is discussed on the basis of atmospheric dynamics, atmospheric thermodynamics, water phase change processes, and radiative processes. The mechanisms of global warming and ozone hole formation and the significant changes currently occurring in the polar regions will be discussed.
40PLS022**	Ice-core paleoclimatology	2	The principles and methods of climatic reconstructions will be introduced. It also provides basics on the past climate and environmental changes such as glacial-interglacial cycles, abrupt climate changes, and the roles of polar regions.
40PLS023**	Circulation systems of water and materials in the polar atmosphere	2	This subject describes the circulation systems of water and materials and their impact on the energy budget in the polar/global atmosphere. It also covers the practical topics on atmospheric physics and chemistry including the methodology for observation and data analysis. Students will work in a group to read scientific papers in turn.
40PLS024**	Cryosphere Science	2	This subject aims at understanding the role played by the cryosphere in the Earth's system. Composed mainly of ice sheets, glaciers, snowcover, frozen ground and sea ice, the cryosphere is a key factor in the climate change system. In addition to understanding the glaciological sciences, this subject deals with their relationship to global environmental change. Students will also learn methods of field observation and laboratory analysis and of data organization. Field observation exercises or practical training in a laboratory may be provided if requested. Occasionally, students will read scientific papers in turn.
40PLS025**	Introduction to Polar Oceanography	2	Sea ice extent in both polar oceans covers about 10% area in total earth surface. This subject gives a lecture on geophysical phenomena in the Arctic and Southern oceans and relationship to the global climate system through sea ice variations. Also, water and ice, having unique characteristics, and basic interpretation on sea ice formation/melting processes will be lectured in accompanied with recent scientific topics and future studies on polar oceanography.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS026**	An introduction of Glaciology	2	This subject features explanation and discussion of the physical processes of snow/ice formation in polar ice sheets, including fundamental principles, with presentation of actual research data and recent research topics. The order of study will be according to the flow shown on the class plan of item 8. In addition to the listed items, cutting-edge polar environmental research topics will be discussed, as required.
40PLS027**	Crustal Evolution	2	This subject deals with the evolution of continental crust that forms the surface layer of the Earth. For this purpose, it demonstrates the basic knowledge and analytical technique to understand the crustal evolution by lecture, practical training and reading published scientific papers. Recent examples of geochemical discussion for crustal evolution will be demonstrated.
40PLS028**	Introduction to Marine Geophysics in the Antarctic Region	2	One of the greatest challenges in Earth sciences is understanding the mechanism of continental breakup. The seafloor of the Antarctic Ocean reveals a record of the spreading of the seafloor caused by the separation of Gondwana and of the evolution of the Antarctic plates, important clues to understanding the process of continental fragmentation. The seafloor spreading and plate tectonic evolution processes are deduced through geophysical observations such as seafloor topography, magnetic and gravity anomalies. This subject provides an outline of the features of the Antarctic plates in the context of the world's plate tectonics, through geophysical observations such as seafloor topography, magnetic and gravity anomalies. It also discusses ship-based observation equipment and data processing.
40PLS029**	Polar Seismology	2	Polar seismology covers the various kinds of phenomena in geosphere, as well as physical interaction between cryosphere, ocean and atmosphere involving global warming. This lecture deals with significant characteristics of seismic wave propagation, seismicity including glacial earthquakes, structure and dynamics of the crust and mantle, as well as the deep interior of the Earth. The observation technique in polar region, data management and international collaboration are demonstrated.
40PLS030**	Planetary material science	2	Meteorites are of many and various types, but they can be broadly classified as primitive or differentiated, according to the process by which they are formed. Since primitive meteorites are made of matter that was never melted, they are thought to embody information about the solid materials from which the solar system was created and the processes by which their materials were formed. On the other hand, differentiated meteorites are thought to have melted from their parent celestial bodies. In addition to explaining the classification of meteorites, this subject examines the parent bodies.



## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS031**	Paleo- & rock Magnetism	2	This subject discusses the Earth's magnetic field, and explains the mechanism by which rocks acquire natural remnant magnetism and the magnetic characteristics of magnetic minerals. In addition, it gives some ideas about the magnetic environment of volcanic rocks, and deep sea sediments. Furthermore, it introduces techniques and measurement methods for the paleomagnetism, and also Earth dynamics, plate tectonics theory, and magnetostratigraphy.
40PLS032**	Introduction to crustal materials and processes	2	This subject offers an outline of geological phenomena in continental crusts from petrological, mineralogical and geochemical view points. In addition to understanding techniques for interpreting the traces of past changes recorded in the rocks and minerals that make up the Earth's crust, students will learn how the continental crust originated and evolved in the course of the Earth's history.
40PLS033**	Introduction to Solid Earth Geophysics in the Antarctic Region	2	Local characteristics of the Antarctic plate reflect the history of the planet's evolution. Accordingly, to understand the evolution process of Antarctica and its current shape, it is necessary to compare and understand its local characteristics, such as crust and mantle structure, geoid, gravity anomalies and crustal magnetic anomalies, with those of the other areas. This subject describes features of Antarctica, as determined by a seismic velocity survey and/or regional tomography, crustal magnetic survey, and free-air and Bouguer gravity surveys. In addition, details about deformations of the solid Earth induced by the tidal potential, surface loadings and Earth's rotation are also presented.
40PLS034**	An introduction to Quaternary in the polar regions	2	The approximately 2.6 million years of the Quaternary period, the latest period in the Earth's historical evolution, has featured large-scale growth and decay in ice sheet conditions, marked variations in sea levels and dramatic change in the Earth's crust. These factors have enabled nature to take shape as we see it today and for humanity to evolve as it has. As a principal stage for these changes, the polar regions represent a key to understanding how they occurred. This subject begins by explaining the techniques and concepts used to elucidate and recognize the various changes in the evolution of nature during the Quaternary period. Next, the latest research trends are used to discuss the role of Quaternary research in understanding the system of the Earth, to assess the possibility of predicting forthcoming changes in the natural environment and human development. And fundamental numerical analysis dealing with paleoclimatological data will be performed.
40PLS035**	Animal Behaviour and Ecology in Polar Regions	2	This course aims to present an introduction to studies on behaviour and ecology of marine animals in polar region. Students are introduced to the basics of behavioural ecology, and to the ways of adaptations shown by marine animals to the dynamic polar environment. Then, various topics in recent behavioural and ecological studies of marine top predators in polar region will be explored via reading sessions of journal articles.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS036**	Primary production in polar oceans	2	In marine ecosystem primary production is principally the production process of organic matter due to photosynthesis, which is understood to be the starting point of the complex food chains and food webs of the sea. While solar radiation is indispensable for photosynthesis, available sunlight is far more seasonal in the polar oceans than in middle-latitude regions. Whilst summer offers 24 hours of solar radiation and features a midnight sun, winter is the exact opposite. This subject examines the process of primary production in the polar seas in light of these exceptional solar environmental conditions.
40PLS037**	Polar Limnology and Ecology	2	This subject explores the characteristics of lake environments in polar regions, particularly those along the Antarctic coast, from an ecological perspective. It explains the fundamentals of limnology and the ecological discoveries made through limnology. Also covered are field observation and experiment methods used to study the lake ecosystems around the Showa Station where NIPR began observations in recent years.
40PLS038**	Analysis of terrestrial ecosystem in polar regions	2	The objective of this subject is to deepen understanding of the various approaches to research and observation and the methods used to study polar terrestrial ecosystems. Students will be exposed to actual observation activities in polar regions, based on experience in the field.
40PLS039**	Biological oceanography in polar seas	2	Our knowledge on the polar marine environments is essential for understanding the global environmental issues. The unique marine ecosystems of polar regions are closely associated with sea ice formation, and the marine biological production processes centered on these ecosystems strongly influence marine environments. This subject aims to develop a deeper understanding of how this structure relates to the dynamics of marine organisms. In particular, the role of zooplankton in the polar marine ecosystem is outlined. Field work on sea ice will be carried out.
40PLS040**	An exercise for experimental methods on snow and ice studies 1	2	I will teach basic experimental methods and experimental skills to study nature and properties of snow and ice in polar regions. I start from introduction of instruments and basic skills such as error handling. I will teach laboratory skills and field skills. In addition, we learn computer aided control of measurements and computer aided data acquisition. In this 1st semester, I teach basic subjects including: (i) preparations of thick sections and thin sections, (ii) density measurements, (iii) measurement on dielectric permittivity and electrical conductivity, (iv) optical properties and (v) temperature measurements.

## Polar Science

Course Code	Course	Credit	Content of Subject
40PLS041**	An exercise for experimental methods on snow and ice studies 2	2	I will teach basic experimental methods and experimental skills to study nature and properties of snow and ice in polar regions. I start from introduction of instruments and basic skills such as error handling. I will teach laboratory skills and field skills. In addition, we learn computer aided control of measurements and computer aided data acquisition. In this 2nd semester, I teach advanced subjects including: (i) preparations of thick sections and thin sections, (ii) measurements of grain size, shape and grain boundaries, (iii) measurement on crystal orientation fabrics, (iv) air permeability, (v) measurements on dielectric permittivity tensor, and (vi) mechanical properties.
80PLS001**	Special Exercise for Dissertation I A	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS002**	Special Exercise for Dissertation I B	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS003**	Special Exercise for Dissertation II A	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS004**	Special Exercise for Dissertation II B	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS005**	Special Exercise for Dissertation III A	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS006**	Special Exercise for Dissertation III B	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS007**	Special Exercise for Dissertation IV A	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS008**	Special Exercise for Dissertation IV B	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS009**	Special Exercise for Dissertation V A	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
80PLS010**	Special Exercise for Dissertation V B	2	Seminar-style practical exercises are conducted for each of the fields of polar science in which research guidance is provided.
20DPS017**	Geodesy in polar region and application of remote sensing techniques	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022
20DPS027**	Biodiversity in polar regions	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022
20DPS035**	Introduction to Terrestrial Ecology in Polar Region	2	Registration possible only by the students enrolled in SOKENDAI in/before AY2022

## Basic Biology

Course Code	Course	Credit	Content of Subject
40COM003**	Practical Spoken English 1	1	The course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM004**	Practical Spoken English 2	1	Following "Practical Spoken English 1", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM005**	Practical Spoken English 3	1	Following "Practical Spoken English 2", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM006**	Practical Spoken English 4	1	Following "Practical Spoken English 3", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM007**	Practical Spoken English 5	1	Following "Practical Spoken English 4", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM008**	Practical Spoken English 6	1	Following "Practical Spoken English 5", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM009**	Practical Spoken English 7	1	Following "Practical Spoken English 6", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM010**	Practical Spoken English 8	1	Following "Practical Spoken English 7", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM011**	Practical Spoken English 9	1	Following "Practical Spoken English 8", the course focuses on improving and building the communication and presentation skills necessary for researchers.

## Basic Biology

Course Code	Course	Credit	Content of Subject
40COM012**	Practical Spoken English 10	1	Following "Practical Spoken English 9", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM013**	Life Science Retreat I	1	Students and faculty members who are involved in life science research gather for academic exchanges. First-year students in the Five-year Doctoral Program present their research plan and progress.
40COM014**	Life Science Retreat II	1	Students and faculty members who are involved in life science research gather for academic exchanges. Second-year students in the Five-year Doctoral Program present their research progress.
40COM015**	Life Science Retreat III	1	Students and faculty members who are involved in life science research gather for academic exchanges. Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program present their research plan and/or progress.
40COM016**	Life Science Retreat IV	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Doctoral Program present their research progress.
40COM017**	Life Science Retreat V	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Doctoral Program present their research progress.

## Basic Biology

Course Code	Course	Credit	Content of Subject
40BBL001**	Developmental and Regenerative Biology	1	Multicellular organisms develop from a single cell, a fertilized egg through many rounds of cell division, cell differentiation regulated by complex but precise interactions of tissues, and three-dimensional morphogenesis, and produce progeny by reproduction. In this course, lectures regarding to the formation of body axes, mechanism of cell differentiation, cell movements during development, metabolic regulation, which are all essential processes for the morphogenesis of multicellular organisms. In addition, a number of fundamental questions during the course of reproduction will be lectured using a variety of organisms such as animals, plants, and unicellular eukaryotes. Further, mechanisms of regeneration in multicellular organisms are also discussed while comparing with developmental events.
40BBL002**	Evolution and Environmental Biology 1	1	(Mitsuyasu Hasebe) The basic principle of diversity formation and evolution in Bryophytes, Lycophytes, Pteridophytes, and Spermatophytes will be discussed. (Miyo Terao Morita) An overview of the transport and signaling of the phytohormone auxin, which plays an important role in the gravity response of plants. (Yasuhiro Kamei) An overview of the molecular mechanisms of cells against temperature, and introduction of an application method using the mechanism to biological research. (Kenji Takizawa) An overview of the coevolution of planetary environments and photosynthetic organisms.

## Basic Biology

Course Code	Course	Credit	Content of Subject
40BBL003**	Evolution and Environmental Biology 2	1	The course will introduce seven topics on modern evolutionary biology covering the fundamentals of the methods for comparative genomics analyses. The first topic includes variant detection, orthology analysis, whole genome comparison and detection of selection signature. Continuously, it will introduce the evolutionary mechanism that brings about the diversity of organisms. Turnovers of sex determination genes have frequently happened during the evolution of vertebrates. Genetic and genomic basis of this phenomenon will be discussed using fish as models. The evolutionary novelties acquired by insects through evolution will be discussed. Flagella in eukaryotes are the molecular machinery composed of tubulins and other proteins. Roles of tubulin superfamily genes will be discussed in relation with microtubule and flagella structures. Arbuscular mycorrhiza and root nodule symbioses are mutually successful and beneficial interactions on earth. The evolution of plant-microbe symbioses by recruiting or neo-functionalizing common factors will be discussed.
40BBL004**	Bioimaging	1	This course will introduce various methodologies in modern bioimaging that visualize biological structures and phenomena in molecular, cellular, tissue and organism levels, and also image processing/analysis techniques to extract useful information from the obtained digital image data.
40BBL005**	Bioinformatics	1	This two-day intensive course will cover the fundamentals of bioinformatics, with a primary focus on sequence analysis. Topics will range from the basic algorithms used in sequence analysis to the application of bioinformatics in genomic and transcriptomic analyses. The course will consist of both lectures and hands-on activities.
40BBL006**	Introduction to Basic Biology 1	2	Introduction of the research conducted at NIBB by all professors, associate professors, and assistant professors. The 1st part will be offered in the first semester.
40BBL007**	Introduction to Basic Biology 2	2	Introduction of the research conducted at NIBB by all professors, associate professors, and assistant professors. The 2nd part will be offered in the second semester.

## Basic Biology

Course Code	Course	Credit	Content of Subject
40BBL008**	Advanced Conference 1	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 1, and in other years as the Advanced Conference 2 through 5.
40BBL009**	Advanced Conference 2	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 2, and in other years as the Advanced Conference 1, 3 through 5.
40BBL010**	Advanced Conference 3	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 3, and in other years as the Advanced Conference 1, 2, 4 and 5.
40BBL011**	Advanced Conference 4	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 4, and in other years as the Advanced Conference 1 through 3, and 5.
40BBL012**	Advanced Conference 5	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 5, and in other years as the Advanced Conference 1 through 4.



## Basic Biology

Course Code	Course	Credit	Content of Subject
40BBL013**	Basic Biology Seminar I	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar I to V is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 1 students are recommended to attend many seminars that are closely related to their own research theme to cultivate a better understanding.
40BBL014**	Basic Biology Seminar II	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar I to V is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 2 students are recommended not only to listen passively, but also actively ask questions, and write down the content in their reports.
40BBL015**	Basic Biology Seminar III	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar I to V is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 3 students are recommended to participate in seminars in a wide variety of fields to broaden your horizons.

## Basic Biology

Course Code	Course	Credit	Content of Subject
40BBL016**	Basic Biology Seminar IV	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar I to V is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 4 students are recommended to participate in seminars to find out what will contribute to their own research.
40BBL017**	Basic Biology Seminar V	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar I to V is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 5 students are recommended to participate in as wide a range of seminars as possible, keeping in mind that they will be useful for consideration in choosing career path and research content after obtaining PhD degree.
80BBL001**	Basic Biology Progress I A	2	Receive guidance and advice on research progress and future directions at meetings with their assigned Progress Committee members. I to V correspond to the grades, taken in the order of A and B.
80BBL002**	Basic Biology Progress I B	2	
80BBL003**	Basic Biology Progress II A	2	
80BBL004**	Basic Biology Progress II B	2	
80BBL005**	Basic Biology Progress III A	2	

## Basic Biology

Course Code	Course	Credit	Content of Subject
80BBL006**	Basic Biology Progress III B	2	Receive guidance and advice on research progress and future directions at meetings with their assigned Progress Committee members. I to V correspond to the grades, taken in the order of A and B.
80BBL007**	Basic Biology Progress IV A	2	
80BBL008**	Basic Biology Progress IV B	2	
80BBL009**	Basic Biology Progress V A	2	
80BBL010**	Basic Biology Progress V B	2	
80BBL011**	Basic Biology Reading Seminar I A	2	Participate in journal clubs held by researchers in your laboratory and related fields to introduce, explain, and discuss the latest life science articles. I to V correspond to the grades, taken in the order of A and B.
80BBL012**	Basic Biology Reading Seminar I B	2	
80BBL013**	Basic Biology Reading Seminar II A	2	
80BBL014**	Basic Biology Reading Seminar II B	2	
80BBL015**	Basic Biology Reading Seminar III A	2	
80BBL016**	Basic Biology Reading Seminar III B	2	
80BBL017**	Basic Biology Reading Seminar IV A	2	
80BBL018**	Basic Biology Reading Seminar IV B	2	
80BBL019**	Basic Biology Reading Seminar V A	2	
80BBL020**	Basic Biology Reading Seminar V B	2	

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40COM003**	Practical Spoken English 1	1	The course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM004**	Practical Spoken English 2	1	Following "Practical Spoken English 1", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM005**	Practical Spoken English 3	1	Following "Practical Spoken English 2", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM006**	Practical Spoken English 4	1	Following "Practical Spoken English 3", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM007**	Practical Spoken English 5	1	Following "Practical Spoken English 4", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM008**	Practical Spoken English 6	1	Following "Practical Spoken English 5", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM009**	Practical Spoken English 7	1	Following "Practical Spoken English 6", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM010**	Practical Spoken English 8	1	Following "Practical Spoken English 7", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM011**	Practical Spoken English 9	1	Following "Practical Spoken English 8", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM012**	Practical Spoken English 10	1	Following "Practical Spoken English 9", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM013**	Life Science Retreat I	1	Students and faculty members who are involved in life science research gather for academic exchanges. First-year students in the Five-year Doctoral Program present their research plan and progress.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40COM014**	Life Science Retreat II	1	Students and faculty members who are involved in life science research gather for academic exchanges. Second-year students in the Five-year Doctoral Program present their research progress.
40COM015**	Life Science Retreat III	1	Students and faculty members who are involved in life science research gather for academic exchanges. Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program present their research plan and/or progress.
40COM016**	Life Science Retreat IV	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Doctoral Program present their research progress.
40COM017**	Life Science Retreat V	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Doctoral Program present their research progress.
40PHS001**	Brain science e-learning	1	Advanced knowledge necessary for brain science can be learned through an e-learning system with lecture and small tests.
40PHS002**	Basic physiological and anatomical brain science	1	Basic physiology and anatomy on brains as well as basic knowledge on information science relevant for neuroscience can be learned through 10 lectures.
40PHS003**	Principle and Methodology in Brain Science	1	Basic principles and methodologies essential to understand brain science will be explained.
40PHS004**	Molecular and Cellular Physiology 1	1	Ion channels, receptors and cell-adhesion molecules in neurons and epithelial cells will be introduced from the point of view of their structure, function, regulation and analytical methods.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40PHS005**	Molecular and Cellular Physiology 2	1	Molecular bases of ion channels and membrane transporters as well as intracellular signal transduction will be introduced to understand physiological functions of neurons and epithelial cells.
40PHS006**	Regulation of Biological Function 1	1	The homeostasis of the organism is maintained by the communication of various organs, and its abnormality causes the diseases. In this lecture, we outline the role of each organ for controlling the blood circulation, feeding, metabolism, temperature, and sensory regulation from the viewpoint of inter-organ interaction.
40PHS007**	Regulation of Biological Function 2	1	The homeostasis of the organism is maintained by the communication of various organs, and the abnormality causes the disease. In this lecture, we outline the role of each organization for controlling muscle movement, endocrine, and temperature regulation from the viewpoint of inter-organ interaction.
40PHS008**	Fundamental Neuroscience 1	1	In order to understand the mechanisms underlying information processing in the brain, this course reviews the properties and functions of neurons and glia cells, the neural mechanisms for visual and somatosensory functions, circuit models of information processing, neural basis of biological rhythms, and methods for measuring neural activity.
40PHS009**	Fundamental Neuroscience 2	1	In order to understand the functional development and plasticity of the brain, this course reviews the development of neurons and neural circuits, activity-dependent synaptic plasticity and remodeling, and homeostatic development.
40PHS010**	System Neuroscience 1	1	This course reviews the neural mechanisms underlying movement, vision, and social cognition as well as neural dynamics from the viewpoint from physiology and disease.
40PHS011**	System Neuroscience 2	1	This course reviews the brain mechanisms underlying movement, emotion, learning, and social cognition in physiology and disease.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40PHS012**	Methodology in Physiological Sciences	1	Students will be assigned to a laboratory different from the one to which they belong, where they will learn the principles of various research techniques used in physiological sciences and receive instruction through hands-on experience.
40PHS013**	Special Lectures in Physiological Sciences 1	1	The cutting-edge research being conducted by researchers at NIPS will be lectured, including the background, methods, latest findings, and significance. This lecture does not duplicate the contents of Special Lectures in Physiological Sciences 2.
40PHS014**	Special Lectures in Physiological Sciences 2	1	The cutting-edge research being conducted by researchers at NIPS will be lectured, including the background, methods, latest findings, and significance. This lecture does not duplicate the contents of Special Lectures in Physiological Sciences 1.
40PHS015**	Clinical pathophysiology 1	1	Lecturers in the basic fields will give an overview of the mechanisms of normal functioning of the brain or organs of the body. After that, clinical researchers invited from outside will give a lecture on the clinical pathology and treatment for diseases caused by functional abnormalities of the corresponding organs.
40PHS016**	Clinical pathophysiology 2	1	Lecturers in the basic fields will give an overview of the mechanisms of the normal functioning of the cortical networks, basal ganglia circuits, and synapses. After that, clinical researchers invited from outside will give a lecture on the clinical pathology and treatment for diseases caused by functional abnormalities of the corresponding organs.
40PHS017**	Clinical and Social Medicine Seminar 1	1	Students participate in research meetings related to clinical and social medicine held at NIPS to learn the latest research findings. The research meetings do not overlap with those in Clinical and Social Medicine Seminar 2.
40PHS018**	Clinical and Social Medicine Seminar 2	1	Students participate in research meetings related to clinical and social medicine held at NIPS to learn the latest research findings. The research meetings do not overlap with those in Clinical and Social Medicine Seminar 1.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40PHS019**	Special lectures in clinical medicine	1	This course covers topics related to the treatment of diseases with drugs and the findings of translational research leading to the development of new therapies.
40PHS020**	Special lectures in oncology	1	This course provides an overview of the state-of-the-art knowledge on the nature and treatment of cancer, which has the highest mortality rate of all diseases.
40PHS021**	Special lectures in social medicine	1	This course will explain the handling and utilization of medical information, which occupies an important position in social medicine.
40PHS022**	Physiological Science Seminar I	1	First-year students in the Five-year Doctoral Program participate in research seminars or scientific meetings held at NIPS to learn about cutting-edge research in physiological sciences directly from the researchers themselves.
40PHS023**	Physiological Science Seminar II	1	Second-year students in the Five-year Doctoral Program participate in research seminars or scientific meetings held at NIPS to learn about cutting-edge research in physiological sciences directly from the researchers themselves.
40PHS024**	Physiological Science Seminar III	1	Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program participate in research seminars or scientific meetings held at NIPS to learn about cutting-edge research in physiological sciences directly from the researchers themselves.
40PHS025**	Physiological Science Seminar IV	1	Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Doctoral Program participate in research seminars or scientific meetings held at NIPS to learn about cutting-edge research in physiological sciences directly from the researchers themselves.



## Physiological Sciences

Course Code	Course	Credit	Content of Subject
40PHS026**	Physiological Science Seminar V	1	Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Doctoral Program participate in research seminars or scientific meetings held at NIPS to learn about cutting-edge research in physiological sciences directly from the researchers themselves.
80PHS001**	Physiological Science Progress I A	2	First-year students in the Five-year Doctoral Program present their research project and the academic background for their research to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS002**	Physiological Science Progress I B	2	First-year students in the Five-year Doctoral Program present their research plans and progress on their research projects to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS003**	Physiological Science Progress II A	2	Students present their research progress and revised research plan since Physiological Science Progress IB to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS004**	Physiological Science Progress II B	2	Students summarize their findings and data obtained from the research project they have been conducting for two years, present them to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS005**	Physiological Science Progress III A	2	Students in the Five-year Doctoral Program develop a research plan for their doctoral degree based on two years of research. First-year students in the Three-year Doctoral Program set a research project for doctoral degree research and develop their research plan. Students present these to their advisors and other faculty members and receive advice on their research and presentation.
80PHS006**	Physiological Science Progress III B	2	Students present their research progress and revised research plan since Physiological Science Progress IIIA to their supervisors and other faculty members, and receive advice on their research and presentation.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
80PHS007**	Physiological Science Progress IV A	2	Students present their research progress and revised research plan since Physiological Science Progress IIIB to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS008**	Physiological Science Progress IV B	2	Students present their research progress and revised research plan since Physiological Science Progress IVA to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS009**	Physiological Science Progress V A	2	Students present their research progress and revised research plan since Physiological Science Progress IVB to their supervisors and other faculty members, and receive advice on their research and presentation.
80PHS010**	Physiological Science Progress V B	2	Students present the status of their doctoral dissertation preparation or the progress of their research toward a doctoral dissertation to their advisor and other faculty members, and receive advice on their research and presentations.
80PHS011**	Physiological Science Reading Seminar I A	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to gain an overview of the papers.
80PHS012**	Physiological Science Reading Seminar I B	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to understand the details of the papers' research findings.
80PHS013**	Physiological Science Reading Seminar II A	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to understand the experimental methods used in research.
80PHS014**	Physiological Science Reading Seminar II B	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to understand the advances in the papers' research considering previous studies.

## Physiological Sciences

Course Code	Course	Credit	Content of Subject
80PHS015**	Physiological Science Reading Seminar ⅢA	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to understand the logic flow of the papers throughout their introduction, results and discussion.
80PHS016**	Physiological Science Reading Seminar ⅢB	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to further understand the logic flow of the papers throughout their introduction, results and discussion.
80PHS017**	Physiological Science Reading Seminar ⅣA	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to get English expressions used in research papers as well as scientific knowledge.
80PHS018**	Physiological Science Reading Seminar ⅣB	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to further get English expressions used in research papers as well as scientific knowledge.
80PHS019**	Physiological Science Reading Seminar ⅤA	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to develop the ability to critically evaluate papers.
80PHS020**	Physiological Science Reading Seminar ⅤB	2	Students will participate in seminars that involve the close reading, explanation, and discussion of current life science papers to further develop the ability to critically evaluate papers.

## Genetics

Course Code	Course	Credit	Content of Subject
40COM013**	Life Science Retreat I	1	Students and faculty members who are involved in life science research gather for academic exchanges. First-year students in the Five-year Doctoral Program present their research plan and progress.
40COM014**	Life Science Retreat II	1	Students and faculty members who are involved in life science research gather for academic exchanges. Second-year students in the Five-year Doctoral Program present their research progress.
40COM015**	Life Science Retreat III	1	Students and faculty members who are involved in life science research gather for academic exchanges. Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program present their research plan and/or progress.
40COM016**	Life Science Retreat IV	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Doctoral Program present their research progress.
40COM017**	Life Science Retreat V	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Doctoral Program present their research progress.
40GNT001**	Molecular and Cellular Biology 1	1	Basic features of molecular and cellular biology will be lectured and discussed. These include regulation of transcription and translation, protein structure and function, post-translational modification, structure and dynamics of chromosome.
40GNT002**	Molecular and Cellular Biology 2	1	Basic features of molecular and cellular biology will be lectured and discussed. These include dynamics of cell, organelles and cytoskeleton, metabolism, protein traffic, signal transduction and cell imaging.

## Genetics

Course Code	Course	Credit	Content of Subject
40GNT004**	Developmental Biology 1	1	Various developmental events, such as cell fate determination, cell differentiation, morphogenesis and animal behavior will be analyzed in light of gene expression, cell-cell interaction, intracellular signaling and evolution. Classes will be run by critical reading of the primary literature and discussion.
40GNT005**	Developmental Biology 2	1	Various developmental events, such as cell fate determination, cell differentiation, morphogenesis and animal behavior will be analyzed in light of gene expression, cell-cell interaction, intracellular signaling and evolution. Classes will be run by critical reading of the primary literature and discussion.
40GNT006**	Evolutionary Genomics	1	After introduction of basic knowledge on various fields of evolutionary and population genetics, such as adaptive evolution, neutral evolution, speciation, and symbiosis evolution, we discuss what kinds of new questions will be possible to answer by employing emerging genomic technologies.
40GNT007**	Genetics	1	This lecture focuses on how to proceed life science researches based on genetics, introducing the various model organisms. The advantages and disadvantages of each model organism as well as the phenomena and the universal laws of genetics will be lectured. This lecture will help students to comprehend the basic concepts, approaches and current techniques in genetics, including diversity of living organisms.

## Genetics

Course Code	Course	Credit	Content of Subject
40GNT008**	Oral Scientific Communication 1	2	Practical, small-group seminar to develop your skills for logical and effective communication of research content and themes. The course highlights the difficulties faced by the audience of scientific presentations to comprehend data and the meaning and significance of research findings. Students will learn effective strategies and concepts to overcome these difficulties through practical activities and learn to present and discuss their research in a logical and easy-to-comprehend manner. Course participants will have the opportunity to present their own research and receive feedback and suggestions from NIG faculty and researchers.
40GNT003**	Oral Scientific Communication 2	1	Scientific seminars are a very important source of information for scientists; however, effective comprehension of seminar contents requires sufficient knowledge of both language and science. This course aims to increase students' comprehension of seminar contents through attendance and discussion of real English scientific seminars. After first attending seminars given at NIG, students meet to discuss the contents of the seminar, deepen their understanding of the contents, and clarify any questions they may have.
40GNT009**	Fundamentals of Scientific Writing	1	This course will explore principles of scientific writing in English. Lectures, in-class discussions and assignments will focus on developing judgement or taste in evaluating existing material and on implementing such skills to improve one's own writing. Topics will include fundamentals of writing (e.g., sentence construction, transitions, cohesion) as well as specifics of preparing scientific papers and proposals as well as professional material such as applications.

## Genetics

Course Code	Course	Credit	Content of Subject
40GNT010**	Genetics Seminar I	1	<p>National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of first-year students.</p>
40GNT011**	Genetics Seminar II	1	<p>National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of second-year students.</p>

## Genetics

Course Code	Course	Credit	Content of Subject
40GNT012**	Genetics Seminar III	1	<p>National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of third-year students.</p>
40GNT013**	Genetics Seminar IV	1	<p>National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of fourth-year students.</p>



## Genetics

Course Code	Course	Credit	Content of Subject
40GNT014**	Genetics Seminar V	1	<p>National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of fifth-year students.</p>
80GNT001**	Genetics Progress I A	2	<p>Conducted during the first 3-4 months of enrollment. One-on-one meeting with a progress committee member (chair). Students prepare presentation materials and explain their research topics and plans to the committee member. Students deepen their understanding of their own research by answering questions and receiving advice from the committee member. After the interview, students receive a written report from the committee member with his/her evaluation and advice, which will be used as a reference for the rest of their research life.</p>
80GNT002**	Genetics Progress I B	2	<p>Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their first year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.</p>

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT003**	Genetics Progress II A	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the first semester of their second year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.
80GNT004**	Genetics Progress II B	2	Students prepare and submit a D2 progress report (a paper on a specific research project) summarizing the results of their research after enrollment, along with other required documents. An open oral research presentation is given and questions from the audience, including the progress committee members, are answered. A closed-door meeting with four members of the progress committee follows to discuss the contents of the D2 progress report and the research presentation in more depth. Based on these results and students' performance, students are evaluated for eligibility for the master's degree and promotion to the third year.
80GNT005**	Genetics Progress III A	2	One-on-one meeting with a progress committee member (chair). Students prepare presentation materials and explain their research theme, progress, and future research plans to the committee member. For third-year transfer students who have just entered the program, the presentation focuses on their thoughts about setting up a research theme and their research plan. Students deepen their understanding of their own research by answering questions and receiving advice from the committee member. After the interview, students receive a written report from the committee member with his/her evaluation and advice, which will be used as a reference for the rest of their research life.

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT006**	Genetics Progress III B	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their third year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.
80GNT007**	Genetics Progress IV A	2	Students prepare a D4 progress report in English in the form of a doctoral thesis and submit it together with the activity report. Hold a closed-door committee meeting with four progress committee members and explain the progress of their research and future research plans to the committee members. Hold an in-depth question-and-answer session with the progress committee members and receive advice on their research and guidance on how to write their report. After the meeting, students receive a detailed report from the committee members with their evaluation and advice, which will be used as a reference for the rest of their research life.
80GNT008**	Genetics Progress IV B	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their fourth year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members and used as a reference for the completion of the students' doctoral thesis in one year.

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT009**	Genetics Progress V A	2	Students give a public oral presentation of their research during an internal exchange seminar (NIG colloquium) held every Friday afternoon at the National Institute of Genetics, followed by a question-and-answer session with the audience. Afterwards, students hold a closed-door meeting with the four progress committee members to explain the progress of their research and future research plans to the committee members. Discuss in detail the content of the doctoral thesis and establish a common understanding between the committee members and the student regarding the content of research worthy of the degree level.
80GNT010**	Genetics Progress V B	2	After careful discussion with the supervisor, students prepare a draft of the doctoral thesis, which is evaluated (commented) by the progress committee. This is an opportunity for students to improve the quality of the doctoral thesis based on the comments. If the progress committee determines that the doctoral thesis is not complete enough to proceed to the doctoral thesis evaluation, no credit is given and students are not be allowed to apply for the doctoral thesis evaluation.
80GNT011**	Genetics Reading Seminar I A	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their first year, and to be able to make valid arguments.

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT012**	Genetics Reading Seminar I B	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their first year, and to be able to make valid arguments.
80GNT013**	Genetics Reading Seminar II A	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their second year, and to be able to make valid arguments.
80GNT014**	Genetics Reading Seminar II B	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their second year, and to be able to make valid arguments.

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT015**	Genetics Reading Seminar III A	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their third year, and to be able to make valid arguments.
80GNT016**	Genetics Reading Seminar III B	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their third year, and to be able to make valid arguments.
80GNT017**	Genetics Reading Seminar IV A	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their fourth year, and to be able to make valid arguments.

## Genetics

Course Code	Course	Credit	Content of Subject
80GNT018**	Genetics Reading Seminar IVB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their fourth year, and to be able to make valid arguments.
80GNT019**	Genetics Reading Seminar VA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their fifth year, and to be able to make valid arguments.
80GNT020**	Genetics Reading Seminar VB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their fifth year, and to be able to make valid arguments.

## Integrative Evolutionary Science

Course Code	Course	Credit	Content of Subject
40COM013**	Life Science Retreat I	1	Students and faculty members who are involved in life science research gather for academic exchanges. First-year students in the Five-year Doctoral Program present their research plan and progress.
40COM014**	Life Science Retreat II	1	Students and faculty members who are involved in life science research gather for academic exchanges. Second-year students in the Five-year Doctoral Program present their research progress.
40COM015**	Life Science Retreat III	1	Students and faculty members who are involved in life science research gather for academic exchanges. Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program present their research plan and/or progress.
40COM016**	Life Science Retreat IV	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Doctoral Program present their research progress.
40COM017**	Life Science Retreat V	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Doctoral Program present their research progress.
40IES001**	Introduction to Philosophy of Science	1	Philosophy of science analyses methodologies, concepts, and nature of science. In this lecture, we will discuss topics from philosophy of science that will help to understand nature of science.
40IES002**	Science, Technology and Society	1	Through lectures on historical, philosophical, and sociological aspects of science and technology, this course provides students with an opportunity to consider and discuss the social impacts of their own research and research activity in general.
40IES003**	Micro- and Macro-scopic Biology	2	To learn the basics of theoretical biology, evolutionary biology, integrative anthropology, and neurobiology in order to comprehensively understand the mechanisms of evolution.
40IES004**	Life Science & Society	1	This course explores ethical and social issues surrounding the current life science studies, through lectures with historical, philosophical, and sociological perspectives.【Not offered in 2024】



## Integrative Evolutionary Science

Course Code	Course	Credit	Content of Subject
40IES005**	Introduction to the "Science & Society" Sub-thesis	1	This course is designed to provide students with working steps necessary to produce a research proposal for the sub-thesis. Each student is expected to develop an individual thesis topic based on his/her interest and submit written pieces including the final draft of the proposal.
40IES006**	Introduction to the "Biological Science" Sub-thesis	1	This course is designed to provide students with working steps necessary to produce a research proposal for the sub-thesis. Each student is expected to develop an individual thesis topic based on his/her interest and submit written pieces including the final draft of the proposal.
40IES007**	Introduction to Science and Technology Studies	1	This is an introductory reading seminar mainly for those who would write a dissertation on science and society. Reading assignments are mostly essential classics in science and technology studies. Enrollees are expected to read all the reading assignments and to submit a summary for each. Those who wish to enroll must contact the instructor at least one week before the first class.【Not offered in 2024】
40IES008**	Biostatistics	2	Introductory lectures on basic theories of statistical analysis with practical work on biological data using statistical packages.
40IES009**	Integrative Evolutionary Biology	2	Biosystems on the earth can be classified into systems with different levels of complexity, from a cell to society. This course is to discuss evolution of such systems from the viewpoints of "elements (members) in each system", "interaction between elements" and "theory to describe this interaction".
40IES010**	Integrative Anthropology	1	Introduction to various fields of anthropology, including bioanthropology, cultural anthropology, archaeology, primatology, and human behavioral ecology. The lecture will discuss both the biological and social aspects of humans, with particular focus on the relationship between environment and humans.【Not offered in 2024】
40IES011**	Environmental Archaeology	1	Learn various methods in environmental archaeology and discuss about the relationship between humans and environment in the past. Introduction to analytical methods in zooarchaeology and ethnoarchaeobotany including laboratory practice. 【Not offered in 2024】
40IES012**	Human Genetics	1	This course is to introduce how the origin of the human beings is understood through genetics. We discuss how far the acquisition of genetic specificity is explained genetically and how far the genetic diversity of the present human beings are clarified with the latest research results. We will also discuss the role of genetic approaches in the development of physical anthropology.
40IES013**	Evolutionary Physiology	1	An overview of physiological traits from the viewpoint of molecular evolution. Evolution of genes for sensory receptors, immune molecules, and components in metabolic pathways are addressed.【Not offered in 2024】
40IES014**	Cell Biology	1	Topics in molecular cytogenetics. A series of lectures will include molecular structure and function of the intra-cellular supermolecules, DNA, chromatin, and chromosomes in relation to cell cycle dynamics, gene expression, epigenetics, genome evolution, and medical genetics. Lectures will be also given on the recent research trends in the related research fields. 【Not offered in 2024】

## Integrative Evolutionary Science

Course Code	Course	Credit	Content of Subject
40IES015**	Evolutionary Behavioral Ecology	1	This lecture aims to explain both ultimate and proximate approaches for understanding animal behaviour. Particularly, I will talk about fundamental concepts and types of approaches with empirical examples. Students need to read important literatures for discussion.
40IES016**	Biological Anthropology	1	Biological anthropology is a discipline that comprehensively investigates "humans as living organisms" from the perspective of evolution and diversity. In this lecture, we will learn what humans are through the results of research on human evolution, comparative analysis with non-human primates, and analysis of archaeological materials. We will also learn mismatches, that appear in modern society, of human characteristics acquired through evolution, and consider how the findings of biological anthropology can be useful for us to experience a richer life, love, child-rearing, and aging. 【Not offered in 2024】
40IES017**	Laboratory of Basic Biology	2	Laboratory courses. The program will include fields; ecology, molecular biology, cellular biology, histology, physiology, computer programming and scientific writing.
40IES018**	Integrative Evolutionary Science Academic English (Basic) 1	1	This course is based on an education program developed by scientists at NIG. The contents cover various issues and weak points that are frequently observed in scientific situations. Ample opportunity is provided to practice various skills necessary for various aspects of scientific presentation and discussion. Students will receive advice and guidance from a native speaker of English. The basic course covers topics such as structure of oral presentations and useful phrases for discussions. In the advanced course, students will learn more specific skills about explanation of slides and discussions, and exercise these skills thorough making presentations of their research.
40IES019**	Integrative Evolutionary Science Academic English (Basic) 2	1	This course is based on an education program developed by scientists at NIG. The contents cover various issues and weak points that are frequently observed in scientific situations. Ample opportunity is provided to practice various skills necessary for various aspects of scientific presentation and discussion. Students will receive advice and guidance from a native speaker of English. The basic course covers topics such as structure of oral presentations and useful phrases for discussions. In the advanced course, students will learn more specific skills about explanation of slides and discussions, and exercise these skills thorough making presentations of their research.
40IES020**	Integrative Evolutionary Science Academic English (Advance) 1	1	This course is based on an education program developed by scientists at NIG. The contents cover various issues and weak points that are frequently observed in scientific situations. Ample opportunity is provided to practice various skills necessary for various aspects of scientific presentation and discussion. Students will receive advice and guidance from a native speaker of English. The basic course covers topics such as structure of oral presentations and useful phrases for discussions. In the advanced course, students will learn more specific skills about explanation of slides and discussions, and exercise these skills thorough making presentations of their research. 【Not offered in 2024】

## Integrative Evolutionary Science

Course Code	Course	Credit	Content of Subject
40IES021**	Integrative Evolutionary Science Academic English (Advance) 2	1	This course is based on an education program developed by scientists at NIG. The contents cover various issues and weak points that are frequently observed in scientific situations. Ample opportunity is provided to practice various skills necessary for various aspects of scientific presentation and discussion. Students will receive advice and guidance from a native speaker of English. The basic course covers topics such as structure of oral presentations and useful phrases for discussions. In the advanced course, students will learn more specific skills about explanation of slides and discussions, and exercise these skills thorough making presentations of their research. 【Not offered in 2024】
40IES022**	Molecular Evolution	1	Fundamental concepts of molecular evolution (e.g., neutral theory of molecular evolution, natural selection, molecular clock) are introduced with deepening the knowledge on the pattern and underlying molecular mechanism of evolution.
40IES023**	Sensory Physiology	1	Topics in sensory physiology. A series of lectures will be provided about the cellular and molecular mechanisms underlying various senses in animals. 【Not offered in 2024】
40IES024**	Neuroethology	1	This lecture aims to explain both ultimate and proximate approaches for understanding animal behaviour. Particularly, I will talk about fundamental concepts and types of approaches with empirical examples. Students need to read important literatures for discussion. 【Not offered in 2024】
40IES025**	Mathematical Biology	1	Introduction to population demography, dynamics of interacting species, epidemics, character displacement and speciation, behavioural ecology and game theory, sexual selection, biological pattern formation, and stochastic process in population genetics.. 【Not offered in 2024】
40IES026**	Population Genetics	1	Population genetics primarily considers the changes of allele frequencies in a population as a factor of evolution. This class introduces the history and basic theories of population genetics, and the near-future perspective will be discussed. 【Not offered in 2024】
40IES027**	Plant Evolutionary Developmental Biology	1	Land plants have evolved their body plans differing from those of animals. In addition, land plants resiliently adapt their growth and development to various environmental conditions. This lecture will focus on land plant development and environmental adaptation at the molecular and cellular levels. 【Not offered in 2024】
40IES028**	Evolutionary Genomics	1	This lecture, evolutionary genomics, consists with three parts;1) basic concept of molecular evolution, 2) genome decoding, and 3) application of genomic information to evolutionary studies. 【Not offered in 2024】
40IES029**	Population Ecology	1	Population ecology, once said by young researchers a few decades ago to have ended its role, has fully faced on the environmental problems. Conservation of endangered species and the overexploitation and its recovery of bioresources are the most important topics in biodiversity and ecosystem conservation. Population ecology has developed systematic theories as well as statistical techniques to deal with uncertainty. Due to the progress in population genetics and adaptive dynamics in evolution, population ecology is now fused with evolutionary ecology originated from the other field. In this lecture, we will introduce the basis of population ecology and its application to environmental problems, as well as the developmental process of the discipline. 【Not offered in 2024】

## Integrative Evolutionary Science

Course Code	Course	Credit	Content of Subject
40IES030**	Biodiversity	1	Biodiversity is generated by interaction of numerous number of different species. In this class, students will learn and consider the mechanism of generation and maintenance of biodiversity. 【Not offered in 2024】
40IES031**	Evolutionary Developmental Neurobiology	1	Most multicellular animals possess a nervous system with a variety of complexity. This course introduces topics in the evolutionary origin and the diversification of the nervous system in various animals including both vertebrates and invertebrates.
40IES032**	Integrative Evolutionary Science Special Seminar Series I	2	Series of eight lectures by leading scientists in various research fields selected from outsides. Each lecture includes mainly research topics with lecturer's own studies, as well as historical aspects, current status, and future prospects of the development of the research fields including the lecturer's research prospective.
40IES033**	Integrative Evolutionary Science Special Seminar Series II	2	Series of eight lectures by leading scientists in various research fields selected from outsides. Each lecture includes mainly research topics with lecturer's own studies, as well as historical aspects, current status, and future prospects of the development of the research fields including the lecturer's research prospective.
40IES034**	Integrative Evolutionary Science Special Seminar Series III	2	Series of eight lectures by leading scientists in various research fields selected from outsides. Each lecture includes mainly research topics with lecturer's own studies, as well as historical aspects, current status, and future prospects of the development of the research fields including the lecturer's research prospective.
40IES035**	Integrative Evolutionary Science Special Seminar Series IV	2	Series of eight lectures by leading scientists in various research fields selected from outsides. Each lecture includes mainly research topics with lecturer's own studies, as well as historical aspects, current status, and future prospects of the development of the research fields including the lecturer's research prospective.
40IES036**	Integrative Evolutionary Science Special Seminar Series V	2	Series of eight lectures by leading scientists in various research fields selected from outsides. Each lecture includes mainly research topics with lecturer's own studies, as well as historical aspects, current status, and future prospects of the development of the research fields including the lecturer's research prospective.
40IES037**	Evolutionary Game Theory	1	Evolutionary game theory provides a theoretical framework for analyzing conflicts of interests among individuals. It has rich applications to problems in evolutionary ecology as well as in evolutionary studies of human behavior. This introductory course offers an overview of this theory through various examples.
40IES038**	STS and History of Science 1	1	Introduction to the field of Science, Technology, and Society (STS). After reading a textbook, we will explore some specific topics related to public engagement and/or gender studies of science. This class is for students specialized in "science and society."
40IES039**	STS and History of Science 2	1	This is an advanced seminar for graduate students specialized in science and technology studies. Enrollees are expected to read all the reading assignments and to be ready to discuss them in class. Those who wish to enroll must contact the instructor at least one week before the first class 【Not offered in 2024】
40IES040**	STS and History of Science 3	1	In this seminar, students will read both primary and secondary sources in history of science (mostly 20th century) and write a mini research paper. This class is for students specialized in "science and society." 【Not offered in 2024】

**Integrative Evolutionary Science**

Course Code	Course	Credit	Content of Subject
80IES001**	Integrative Evolutionary Science Progress Report IA	1	Seminars based on progress report of students.
80IES002**	Integrative Evolutionary Science Progress Report IB	1	Seminars based on progress report of students.
80IES003**	Integrative Evolutionary Science Progress Report IIA	1	Seminars based on progress report of students.
80IES004**	Integrative Evolutionary Science Progress Report IIB	1	Seminars based on progress report of students.
80IES005**	Integrative Evolutionary Science Progress Report IIIA	1	Seminars based on progress report of students.
80IES006**	Integrative Evolutionary Science Progress Report IIIB	1	Seminars based on progress report of students.
80IES007**	Integrative Evolutionary Science Progress Report IVA	1	Seminars based on progress report of students.
80IES008**	Integrative Evolutionary Science Progress Report IVB	1	Seminars based on progress report of students.
80IES009**	Integrative Evolutionary Science Progress Report VA	1	Seminars based on progress report of students.
80IES010**	Integrative Evolutionary Science Progress Report VB	1	Seminars based on progress report of students.
80IES011**	Specific Research for Sub-thesis	4	Research for Sub thesis.
40IES041**	Developmental Evolutionary Biology	1	What changes in developmental processes (body construction) have occurred through biological evolution, contributing to phenotypic diversification? This lecture aims to offer not only an overview and fundamental understanding of Evolutionary Developmental Biology but also delve into unresolved issues. The format of the lecture will encourage active participation through group discussions.

## Others

Course Code	Course	Credit	Content of Subject
40GAS001**	Sokendai Freshman Course	2	The program gives new students opportunities to develop fundamental knowledge and skills necessary for researcher.
40GAS002**	International Internship	1	The goal of this course is to become able to carry out research abroad on students their own. Students will improve global communication skills and research management skills through finding a host institute, doing research there, communicating with colleagues, experiencing life abroad, etc.
40GAS003**	Cooperative Education through Research Internship	1	This subject is an internship that meet all of the following requirements. 1) The internship is for students in the latter half of doctoral program. 2) The employment period is at least two months with salary. 3) A job description (details of job duties, required knowledge, qualifications, etc.) is presented in advance.

＊講義コードについて Course Code

講義コードの振り方 Numbering of Course Code



Type of Subject Source of Subject Subject Code Number

科目種別 Type of Subject	
通常科目（レベル 1～4 が付される科目） Regular Subjects with level 1 to 4	40
研究指導科目（レベル 1～4 が付されない科目） Subjects for Research Supervision without levels 1 to 4	80

科目提供部局 Source of Subject		
学術院・コース Program		記号
先端学術院	Graduate Institute for Advanced Studies	GAS
人類文化研究	Anthropological Studies	ANS
国際日本研究	Japanese Studies	JST
日本歴史研究	Japanese History	JHS
日本文学研究	Japanese Literature	JLT
日本語言語科学	Japanese Language Sciences	JLS
情報学	Informatics	INF
統計科学	Statistical Science	STS
素粒子原子核	Particle and Nuclear Physics	PNP
加速器科学	Accelerator Science	ACS
天文科学	Astronomical Science	ASS
核融合科学	Fusion Science	FSS
宇宙科学	Space and Astronautical Science	SAS
分子科学	Molecular Science	MLS
物質構造科学	Materials Structure Science	MSS
総合地球環境学	Global Environmental Studies	GES
極域科学	Polar Science	PLS
基礎生物学	Basic Biology	BBL
生理科学	Physiological Sciences	PHS
遺伝学	Genetics	GNT
統合進化科学	Integrative Evolutionary Science	IES
複数コースによる提供	Multiple Programs Offered	COM

(注) この学生便覧に掲載している英訳本文は、和文の内容を参考掲載したものです。大学としての正式な解釈及び適用は和訳本文によります。

**【Attention】**

The English version in this guide is used for reference only and shall not be regarded as a controlling document.

## 学生便覧 “Student Guide”

(2024 年度版)

2024年4月 発行

編集・発行 国立大学法人総合研究大学院大学  
学務課教務係 (Educational Affairs Section/Hayama)  
TEL 046-858-1523  
E-mail [kyomu@ml.soken.ac.jp](mailto:kyomu@ml.soken.ac.jp)