Student application guidelines

2023

Enrollment in October 2022 / April 2023
[Special Admission Examination for International Students]

Graduate School of Science and Engineering

Science and Engineering (Master's Course)

- Mathematics and Informatics Program
- Physics and Applied Physics Program
- Life Science and Material Chemistry Program
- Earth, Life, Environmental Science Program
- Mechatronics Program
- Materials Science and Engineering Program
- Civil Design and Engineering Program
- Advance Clean Energy Program

May 2022

University of Toyama

In the event of an unexpected situation, such as the spread of novel coronavirus infection, the contents of the student application guidelines, including the examination schedule, may be changed. If it is necessary to make such changes, we will inform you on our website, and please be sure to check the latest information.
https://www.u-toyama.ac.jp

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Admission Policy
the Graduate School of Science and Engineering (Master's Course)

Admission Policy

The Graduate School of Science and Engineering seeks students who have a strong interest and basic skills in the field of science and engineering, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture through the use of their specialized knowledge and skills.

-Mathematics and Informatics Program

Mathematics and Informatics Program seeks students who have the qualities to become advanced professionals and researchers in mathematical informatics who can lead technological innovation in terms of mathematics and informatics and contribute to improving the well-being of local people.

-Physics and Applied Physics Program

Physics and Applied Physics Program seeks students who have a strong interest and basic ability in science and engineering, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture using their specialized knowledge and skills.

- Life Science and Material Chemistry Program

Life Science and Material Chemistry Program seeks students who have basic academic skills in the specialized fields of bioengineering, chemistry, and applied chemistry, and who are motivated to contribute as highly skilled professionals with substantial competencies by acquiring a wealth of specialized knowledge and advanced research skills.

-Earth, Life, Environmental Science Program

Earth, Life, Environmental Science Program seeks students who have a strong interest and basic skills in earth, life, and environmental sciences, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture using their specialized knowledge and skills.

-Mechatronics Program

Mechatronics Program seeks students who have a strong interest and basic skills in

the fields of electrical and electronic engineering and mechanical engineering, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture using their specialized knowledge and skills.

-Materials Science and Engineering Program

Materials Science and Engineering Program seeks students who have a strong interest and basic skills in the field of materials science and engineering, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture using their specialized knowledge and skills.

-Civil Design and Engineering Program

Civil Design and Engineering Program seeks students who have a strong interest and basic skills in the field of urban and transportation design, and who are motivated to become engineers and researchers who can contribute to the welfare of humankind by driving technological innovation and contributing to the advancement of culture using their specialized knowledge and skills.

-Advance Clean Energy Program

Advance Clean Energy Program seeks students who have a strong interest and basic skills in the field of clean energy, and who are motivated to become engineers and researchers who can contribute to the welfare of humanity by driving technological innovation and contributing to the advancement of culture through the use of their specialized knowledge and skills.

Basic policy on selection (admission examination types and their evaluation methods)

-Special Admission Examination for International Students

Evaluation will be based on a comprehensive evaluation of the interview (including an academic achievement test (oral)) and application documents (academic records, etc.).

Admission Overview
The Graduate School of Science and Engineering
(October 2022 Enrollment)

Admission Quota

Major	Program name	Admission Quota
		Special Admission Examination for International Students
Department of Science and Engineering	Mathematics and Informatics	A few
	Physics and Applied Physics	A few
	Life Science and Material Chemistry	A few
	Earth, Life, Environmental Science	A few
	Mechatronics	A few
	Materials Science and Engineering	A few
	Civil Design and Engineering	A few
	Advance Clean Energy	A few

Admission Schedule

	Department of Science and Engineering
	Special Admission Examination for International Students
Deadline for Application for Qualification Screening (Applicable only)	Thursday, June 30, 2022
	The result of the screening will be notified to the applicant by the day before the start of the application process for each entrance examination.
Application Period	Friday, July 15 to Friday, July 22, 2022
Mailing of Examination Voucher	Monday, August 8, 2022 (Scheduled)
Date of Examination	Thursday, August 25, 2022
Announcement of Acceptance	Friday, September 9, 2022
Enrollment Procedures (Deadline)	Friday, September 16, 2022 (Scheduled)

Admission Overview
The Graduate School of Science and Engineering
(April 2023 Enrollment)

Admission Quota

Major	Program name	Admission Quota
		Special Admission Examination for International Students
Department of Science and Engineering	Mathematics and Informatics	A few
	Physics and Applied Physics	A few
	Life Science and Material Chemistry	A few
	Earth, Life, Environmental Science	A few
	Mechatronics	A few
	Materials Science and Engineering	A few
	Civil Design and Engineering	A few
	Advance Clean Energy	A few

Admission Schedule

	Department of Science and Engineering	
	Special Admission Examination for International Students (First call for applications)	Special Admission Examination for International Students (Second call for applications)(Scheduled)
Deadline for Application for Qualification Screening (Applicable only)	Thursday, June 30, 2022	Wednesday, November 9, 2022
	The result of the screening will be notified to the applicant by the day before the start of the application process for each entrance examination.	
Application Period	Friday, July 15 to Friday, July 22, 2022	Monday, December 19 to Friday, December 23, 2022
Mailing of Examination Voucher	Monday, August 8, 2022 (Scheduled)	Thursday, January 12, 2023 (Scheduled)

Date of Examination	Thursday, August 25, 2022	Wednesday, February 1, 2023
Announcement of Acceptance	Friday, September 9, 2022	Monday, February 13, 2023
Enrollment Procedures (Deadline)	Wednesday, March 8, 2023 (Scheduled)	

A secondary selection may not be conducted depending on whether the first selection is filled. Whether or not it will be held will be announced on the university website around October 2022.
(https://www.gsse.u-toyama.ac.jp/)

I Special Admission Examination for International Students (October 2022 Enrollment)

1. Number of students to be admitted

	Program	Admission Quota
Department of Science and Engineering	Mathematics and Informatics	A few
	Physics and Applied Physics	A few
	Life Science and Material Chemistry	A few
	Earth, Life, Environmental Science	A few
	Mechatronics	A few
	Materials Science and Engineering	A few
	Civil Design and Engineering	A few
	Advance Clean Energy	A few

(Note) Applicants must consult in advance with the faculty advisor of the program and field of education they wish to pursue regarding the direction of their education and research, etc. Applicants who have not yet decided on a faculty advisor are not eligible to apply.

2. Eligibility of application

Applicants must have non-Japanese citizenship and hold the residence status of 'Student' at the time of admission as stipulated by the Immigration Control and Refugee Recognition Act, and meet one of the following qualif ications. Those who are expected to obtain the residence status of 'Student' may also apply.

(1) Those who have graduated from a Japanese university, or are expected to graduate by September, 2022.
(2) Those who have received, or are expected to receive a bachelor's degree from a Japanese university by September 30, 2022 according to the provisions of Article 104, Paragraph 7, Section 1 of the School Education Law.
(3) Those who have completed, or are expected to complete 16 years of education in foreign countries by September, 2022.
(4) Those who live in Japan and completed, or are expected to complete 16 years of education in correspondencecourses from a foreign-aff iliated educational institution by September, 2022.
(5) Those who have completed, or are expected to complete by September, 2022, a foreign university program offered at an educational facility in Japan that

recognized as having foreign educational system and designated by the Minister of Education, Culture, Sports, Science and Technology. (only for those who are recognized as completing a 16-years of education of that country.)

(6) Those who have completed, or are expected to complete by September 30, 2022, a program of a foreign university or a foreign educational institution (limited to which its comprehensive progress of education and research have been evaluated by an external personnel certif ied by its government or its related agency, or an institution designated as equivalent by the Minister of MEXT) which requires more than three years to graduate and have been awarded a degree equivalent to a bachelor's degree.

(7) Those who have completed a specialized course at a specialized training college designated by the Minister of Education, Culture, Sports, Science and Technology, after the date stipulated by the Minister of Education, Culture,Sports, Science and Technology, after the date stipulated by the Minister of Education, Culture, Sports, Science and Technology. (The terms of study must be four years or more, and must meet the other criteria stipulated by the Minister of Education, Culture, Sports, Science and Technology.)

(8) Those who have been designated by the Minister of Education, Culture, Sports, Science and Technology (Ministry of Education Notif ication No.5, 1953).

(9) Those who have been enrolled in a university for 3 or more years or has completed a 15-year school education course in a foreign country , and has been recognized by the Graduate School of Science and Engineering, University of Toyama as having the prescribed credits with excellent academic results by September 30, 2022.

(10) Those who are from counties where it does not take 16 years to graduate from university, and meet the following two conditions and have been recognized by the Graduates School of Science and Engineering for Education,University of Toyama as having academic abilities equivalent or superior to those of university graduates.

a. Those who, after completing university education, have been engaged or are expected to be engaged in research as research students or researchers for at least one year at university or research institutes equivalent to interuniversity research institute by September 30, 2022.

b. Those who will reach the age of 22 by September 30, 2022.

(11) Those who will reach the age of 22, and have been recognized by individual screening in the Graduates School of Science and Engineering, University of Toyama as having academic abilities equivalent or superior to those of university graduates.

(Note) Please refer to page 17～18 for more information about the certif ication of case (9),(10),or (11).

3. Selection methods

(1) The selection of applicants is based on a comprehensive evaluation of the applicant's academic performance at their home university and an interview (including an oral academic test).

(2) Examination date and venue:

Date	Examination Subjects	Time	Examination Venue
Thursday, August 25, 2022	Oral examination (including an oral academic test)	From 9:30	University of Toyama Gofuku Campus (3190 Gofuku, Toyama City)

II Special Admission Examination for International Students (April 2023 Enrollment)

1. Number of students to be admitted

	Program	Admission Quota
Department of Science and Engineering	Mathematics and Informatics	A few
	Physics and Applied Physics	A few
	Life Science and Material Chemistry	A few
	Earth, Life, Environmental Science	A few
	Mechatronics	A few
	Materials Science and Engineering	A few
	Civil Design and Engineering	A few
	Advance Clean Energy	A few

(Note) Applicants must consult in advance with the faculty advisor of the program and field of education they wish to pursue regarding the direction of their education and research, etc. Applicants who have not yet decided on a faculty advisor are not eligible to apply.

2. Eligibility of application

Applicants must have non-Japanese citizenship and hold the residence status of 'Student' at the time of admission as stipulated by the Immigration Control and Refugee Recognition Act, and meet one of the following qualif ications. Those who are expected to obtain the residence status of 'Student' may also apply.

(1) Those who have graduated from a Japanese university, or are expected to graduatMarche by March, 2023.
(2) Those who have received, or are expected to receive a bachelor's degree from a Japanese university by March 31, 2023 according to the provisions of Article 104, Paragraph 7, Section 1 of the School Education Law.
(3) Those who have completed, or are expected to complete 16 years of education in foreign countries by March, 2023.
(4) Those who live in Japan and completed, or are expected to complete 16 years of education in correspondencecourses from a foreign-aff iliated educational institution by March, 2023.
(5) Those who have completed, or are expected to complete by March, 2023, a foreign university program offered at an educational facility in Japan that

recognized as having foreign educational system and designated by the Minister of Education, Culture, Sports, Science and Technology. (only for those who are recognized as completing a 16-years of education of that country.)

(6) Those who have completed, or are expected to complete by March 31, 2023, a program of a foreign university or a foreign educational institution (limited to which its comprehensive progress of education and research have been evaluated by an external personnel certif ied by its government or its related agency, or an institution designated as equivalent by the Minister of MEXT) which requires more than three years to graduate and have been awarded a degree equivalent to a bachelor's degree.

(7) Those who have completed a specialized course at a specialized training college designated by the Minister of Education, Culture, Sports, Science and Technology, after the date stipulated by the Minister of Education, Culture,Sports, Science and Technology, after the date stipulated by the Minister of Education, Culture, Sports, Science and Technology. (The terms of study must be four years or more, and must meet the other criteria stipulated by the Minister of Education, Culture, Sports, Science and Technology.)

(8) Those who have been designated by the Minister of Education, Culture, Sports, Science and Technology (Ministry of Education Notif ication No.5, 1953).

(9) Those who have been enrolled in a university for 3 or more years or has completed a 15-year school education course in a foreign country , and has been recognized by the Graduate School of Science and Engineering, University of Toyama as having the prescribed credits with excellent academic results by March 31, 2023.

(10) Those who are from counties where it does not take 16 years to graduate from university, and meet the following two conditions and have been recognized by the Graduates School of Science and Engineering for Education,University of Toyama as having academic abilities equivalent or superior to those of university graduates.

a. Those who, after completing university education, have been engaged or are expected to be engaged in research as research students or researchers for at least one year at university or research institutes equivalent to interuniversity research institute by March 31, 2023.

b. Those who will reach the age of 22 by March 31, 2023.

(11) Those who will reach the age of 22, and have been recognized by individual screening in the Graduates School of Science and Engineering, University of Toyama as having academic abilities equivalent or superior to those of university graduates.

(Note) Please refer to page 17～18 for more information about the certif ication of case (9),(10),or (11).

3. Selection methods

(1) The selection of applicants is based on a comprehensive evaluation of the applicant's academic performance at their home university and an interview (including an oral academic test).

(2) Examination date and venue:

First call for applications

Date	Examination Subjects	Time	Examination Venue
Thursday, August 25, 2022	Oral examination (including an oral academic test)	From 9:30	University of Toyama Gofuku Campus (3190 Gofuku, Toyama City)

Second call for applications

Date	Examination Subjects	Time	Examination Venue
Wednesday, February 1, 2023	Oral examination (including an oral academic test)	From 9:30	University of Toyama Gofuku Campus (3190 Gofuku, Toyama City)

- Second call for applications may not be conducted depending on whether the first call for applications is filled. Whether or not it will be held will be announced on the university website around October 2022.

General Procedure of Application and Admission

1. Application Period

Test category	Application period
General Admission Examination Special Admission Examination for Working Adults Admission Examination for International Students	Friday, July 15, 2022 to Friday, July 22, at 16:00
General admission examination (second recruitment) Special Admission Examination for Working Adults (second recruitment) Admission Examination for International Students (second recruitment)	Monday, December 19, 2022 to Friday, December 23 at 16:00

- If you submit your application document in person

Your application document is accepted between 9:00 and 16:00 on weekdays throughout the application period.

- If you mail your application document

Please send it by registered express mail so that it will be delivered to the University during the application period. It must reach the University by 16:00 on the deadline date of the application. However, application documents will be accepted even if they reach the University after the expiration of the application period on condition that they are delivered by registered express mail with a postmark with the date of the day before the application deadline or before (only a postmark put in Japan is acceptable).

2. Application Procedure

Prepare the documents listed below, and submit them to the following address by the above due date.

When sending the application documents by mail, send them by registered express mail, and write “Application for admission to the Graduate School of Science and Engineering inside” in red letters on the envelope.

“Submit to: Examination Section of Admissions Office, Academic and Student Affairs Section, Schools of Science, Engineering, and Sustainable Design, University of Toyama
3190 Gofuku, Toyama City, Toyama Prefecture 930-8555, Japan”

Phone 076-445-6399

Application documents, etc.

Documents, etc.		Relevant applicants	Description
[1]	Application for Admission (Designated form)	All applicants	Fill in the required fields.
[2]	Certificate of graduation (Certificate of expected graduation)*	University graduate (Persons expected to graduate)	The document shall be prepared by the president or dean of the university the applicant graduated from. Applicants who are expected to graduate from University of Toyama do not need to submit the certificate.
[3]	Academic Transcript*	All applicants	The document shall be prepared and sealed by the president or dean of the university the applicant graduated from. However, no sealing is required when anti-counterfeiting and anti-copying paper is used.
[4]	Examination Admission Card and Photo ID Card (Designated form)	All applicants	Fill out the necessary information and attach a photo of the applicant (H4cm×W3cm, upper body with no head covering, headshot taken within the last 3 months).
[5]	Envelope for sending back Examination Admission Card (Chokei 3 envelop [120 x 235 mm])	All applicants	This is used to send the Examination Admission Card to you. Indicate your address and affix 344-yen postage stamps on it.
[6]	Pasting Sheet for Certificate of Payment of Examination Fee	All applicants	After the payment of the examination fee, download a “Certificate of Payment of Examination Fee” from the examination fee payment website. Print and attach it in the designated area on the “Sheet for attaching Certificate of Payment of Examination Fee,” and then submit it to us.
[7]	Letter of approval for taking the examination (Any form acceptable)	Applicants who have enrolled in a graduate school of another university or are employed in a government or public office, company, etc.	The document shall be prepared by the head of the graduate school the applicant is attending or head of the applicant’s organization. (Any form acceptable)
[8]	Statement of Purpose (Designated form)	Applicants for General Admission Examination, Special Admission Examination for Working Adults, and Admission Examination for International Students.	Must be written by the applicant.
[9]	Pledge (Designated form)	All applicants	Sign the Pledge of Compliance with the “Foreign Exchange and Foreign Trade Act.” **Security Export Control** University of Toyama has established the University of Toyama Security Export Control Regulations based on the Foreign Exchange and Foreign Trade Act, and conducted strictly screening when accepting international students in the perspective of providing technology and export of research equipment

			and materials. Since international students who fall under any of the regulated items, they may not be able to get the permission to enroll or receive the desired education, or they may have restrictions on their desired research activities at University of Toyama. [Reference] University of Toyama Security Export Control Regulations URL http://www3.u-toyama.ac.jp/soumu/kisoku/pdf/0110401.pdf
[10]	Copy of Certificate of Residence, etc.	Applicants of foreign nationality only.	Foreign nationals currently residing in Japan are requested to submit a copy of their residence certificate (indicating a clear status of residence) or a copy of their residence card (both sides) issued by the mayor of the city, town or village they reside in.

(Note) Documents written in a foreign language other than English must be accompanied by documents translated into Japanese or English.

(1) It is also acceptable to fill out the designated forms using a PC. When filling out the forms with a writing tool, please use a black ballpoint pen and write in block letters carefully. The designated forms shall be downloaded from our website and printed out in A4 size. Please do not fill in the * marked fields.

(2) For applicants for general admission examination, admission examination with recommendation, and special admission examination for working adults based on the eligibility (2), and applicants for admission examination for international students based on the eligibility (2) of general admission examination, the specified documents (degree certificate, evidence of applying for the awarding of the degree certificate, etc.) must be submitted.

3. Payment of the Examination Fee

Pay the examination fee of 30,000 yen via the examination fee payment website in accordance with the examination fee payment procedure (page 16).

https://e-apply.jp/n/toyama-gs-payment/

Remarks

- All applicants must pay the administrative fee in addition to the examination fee.
- When making the payment, register the same “name,” “address,” and other personal information as those written in the Application for Admission.
- The Examination Fee can be paid from 1 week before the start of the Application Period.

The entrance examination fees, once paid, will not be refunded for any reason except in the following cases.

[1] The applicant has paid the entrance examination fee but has not filed an application to the University of Toyama (e.g. he/she has failed to submit the application

documents, or his/her application documents have not been accepted),

[2] The applicant has paid the examination fee twice,

[3] The applicant has paid more than the examination fee,

(Note) If you need to request a refund of the examination fee, the “Refund Claim for Examination Fee” (designated form) must be mailed to the University of Toyama with the “Certificate of Payment of Examination Fee” attached.

Send to: Accounting Group, Financial Affairs Division, University of Toyama, 3190 Gofuku, Toyama City, Toyama Prefecture 930-8555, Japan

Phone 076-445-6053

Payment Flow of Entrance Examination Fee

Prepare an Email address, a computer that is connected to the Internet, and printer.

Your application is NOT complete until you have registered your information in the entrance examination fee payment website.
Send us the required documents and the examination fee payment certificate to University of Toyama.

Payment Website

STEP 1 Go to the Entrance Examination Fee Payment Website

The Entrance Examination Fee Payment Website

https://e-apply.jp/n/toyama-gs-payment/

or

Official Website of University of Toyama

https://www.u-toyama.ac.jp/admission/graduate/index.html

Register

STEP 2 Register Personal Information

1) Make sure you follow the screen procedures and important notices.
2) Choose the payment method of entrance examination fee.
3) Enter the required information and record the payment processing number.

Payment

STEP 3 Pay Entrance Examination Fee

【Pay at the Convenience Store, Pay-easy ATM banks, Internet banking】

Make a payment at the convenience stores (Seven Eleven, Lawson, Ministop, Family Mart, Daily Yamazaki, and Seico Mart), Pay-easy ATMs of Post offices or Banks, and internet banking.

※Payment can not be made at stores outside Japan.

【Pay with Credit Card】

Make sure the card number, expiration date, card holder name, and security code, to pay the fee.

(Accepted Credit Cards)
VISA, Master, JCB, AMERICAN EXPRESS, MUFG Card, DC Card, UFJ Card, NICOS Card

Print

STEP 4 Print out the Certificate of Payment

The Entrance Examination Fee Payment Website

https://e-apply.jp/n/toyama-gs-payment/

Click on "Review" button to download and print out the Certificate of Payment. Cut along the dotted lines to get your certificate of payment, then paste it on its designated location in the application form.

Send

STEP 5 Send all application documents

Send the form with pasted certificate of payment and all other application documents, via registered express mail at the post office, within the application submission deadline.

※See the details of each school/graduate school for application guide.

- Make sure the information you enter is correct, as you will not be able to revise/change any of this information after registration is complete. However you may re-register the correct information and "revise" the information this way, as long as it is before you have made the payment.

※Take notice that if you chose to pay with your credit card, the payment will be made as soon as you register your personal information.

4. Examination of Eligibility for Application

Applicants for admission examination for international students based on the eligibility (9), (10), (11) for general admission examination or (6) for special admission examination for working adults need to be assessed in advance. Therefore, they are requested to contact us in advance, and should apply with the necessary documents in time for the following application deadline.

Test category	Application deadline
(First recruitment including admission in October 2022) Admission Examination for International Students	16:00 on Thursday, June 30, 2022
(Second recruitment) Admission Examination for International Students	16:00 on Wednesday, November 9, 2022

If you hand in the documents in person to the University, they are accepted between 9:00 and 16:00.

If you mail them, they must arrive by 16:00 on the application deadline date.

For inquiry and procedures about Examination of Eligibility for Application, contact:

Examination Section of Admissions Office, Academic and Student Affairs Section,
Schools of Science, Engineering, and Sustainable Design, University of Toyama
3190 Gofuku, Toyama City, Toyama Prefecture 930-8555, Japan

The following documents are required for the Examination of Eligibility for Application.

Eligibility for application	Application documents
General admission examination (9) * Persons who have been enrolled in a university for at least 3 years (or expected to do so)	[1] Application for Examination of Eligibility for Application (Designated form) [2] Academic Transcript (in the form of the universities and faculties in which the applicant has enrolled) [3] Letter of Recommendation [for Examination of Eligibility for Application] (Designated form) [4] Certificate of Enrollment (Not required for current University of Toyama students) [5] Education curriculum of the university or others in which the applicant has enrolled [6] Statement of Purpose (Designated form) [7] Self-addressed envelope (Clearly indicate your name and address on a Chokei 3 envelope and affix postal stamps worth 344 yen.)
General admission examination (9) * A person who has completed a 15-year school education course in a foreign country.	[1] Application for Examination of Eligibility for Application (Designated form) [2] Academic Transcript (in the form of the universities and faculties in which the applicant has enrolled) [3] Copy of Application for Admission [4] Certificate of enrollment (in the form of the university and faculty in which the applicant has enrolled) [5] Education curriculum of the university or others in which the applicant has enrolled

	[6] Statement of Purpose (Designated form) [7] Self-addressed envelope (Clearly indicate your name and address on a Chokei 3 envelope and affix postal stamps worth 344 yen.)
General admission examination (10)	[1] Application for Examination of Eligibility for Application (Designated form) [2] Academic Transcript (in the form of the universities and faculties in which the applicant has enrolled) [3] Copy of Application for Admission [4] Certificate of graduation (in the form of the university/faculty from which you graduated) [5] Certificate (or provisional certificate) of Research Career issued by universities, research institutions, etc. [6] Statement of Purpose (Designated form) [7] Self-addressed Envelope (Clearly indicate your name and address on a Chokei 3 envelope and affix postal stamps worth 344 yen.)
General admission examination (11) Special admission examination for working adults (6)	[1] Application for Examination of Eligibility for Application (Designated form) [2] Academic Transcript (in the form of the school, etc. you are from) [3] Copy of Application for Admission [4] Certificate of graduation (in the form of the school, etc. you are from) [5] Certificate (or provisional certificate) of Research Career issued by universities or research institutions, or certificate (or provisional certificate) of work experience [6] Statement of Purpose (Designated form) [7] Self-addressed envelope (Clearly indicate your name and address on a Chokei 3 envelope and affix postal stamps worth 344 yen.)

(Note) (1) Documents written in a foreign language other than English must be accompanied by documents translated into Japanese or English.

(2) General admission examination (9) is for applicants who wish to skip the entrance examination, so 4th year students do not need to be screened.

The results of the Examination of Eligibility for Application will be notified to the applicant by the day before the application for each admission examination is opened.

5. Announcement of Successful Applicants

At the time of the day shown below, the examinee number of each successful applicant will be posted on the website of the University of Toyama, and a Letter of Acceptance will be mailed to each successful applicant.

We will not respond to any inquiries by telephone or other means.

Test category	Date of announcement
(First recruitment including admission in October 2022) General Admission Examination Special Admission Examination for Working Adults Admission Examination for International Students	15:00 on Friday, September 9, 2022
(Second recruitment) General admission examination Special Admission Examination for Working Adults Admission Examination for International Students	15:00 on Monday, February 13, 2023

Website of University of Toyama https://www.gsse.u-toyama.ac.jp/

6. Admission Procedure

The admission procedure is as follows. More details will be separately notified to the successful applicants.

(1)Admission procedure starting date

Test category	Admission procedure starting date
(October 2022 Enrollment) General Admission Examination Special Admission Examination for Working Adults Admission Examination for International Students	Friday, September 16, 2022 (Scheduled)
(First recruitment) General Admission Examination Special Admission Examination for Working Adults Admission Examination for International Students	Wednesday, March 8, 2023 (Scheduled)
(Second recruitment) General admission examination Special Admission Examination for Working Adults Admission Examination for International Students	Wednesday, March 8, 2023 (Scheduled)

(2)Expenses required for the admission procedure

[1] Enrollment fee: 282,000 yen (Subject to change)

The Enrollment Fee shown above is the planned amount. If it is revised at the time of enrollment, the new Enrollment Fee will apply.

[2] Other expenses: The successful applicants must pay other expenses, including the Personal Accident Insurance for Students Pursuing Education and Research, etc.

(Note 1) Tuition fees must be paid after enrollment. The exact amount of the tuition fees and detailed payment method will be announced at the time of the admission procedure.

<Reference> Tuition fee for academic year 2022: 535,800 yen per annum

If a successful applicant declines the admission, be sure to complete the procedure in writing (any form acceptable).

(Note 2) Persons who find it difficult to pay the enrollment fee and tuition fee may be exempted or deferred from collection after deliberation. Persons who desire to apply for a scholarship will be screened and may be granted a scholarship loan by the Japan Student Services Organization, etc.

(3) Remarks

If you do not complete the admission procedure within the Admission procedure period, you will be considered to have declined the admission.

7. Handling of Personal Information of Applicants

Personal information possessed by University of Toyama shall be handled based on the Act on the Protection of Personal Information Held by Independent Administrative Agencies, etc., and University of Toyama Personal Information Protection Policy.

(1) Personal information (including name, address, etc.) of applicants obtained through the application shall be used for ① application and selection procedure, ② announcement of successful applicants, ③ admission procedure, ④ survey/study of the selection method, and ⑤ operations associated with these purposes.

(2) Personal information of those who completed the admission procedure obtained through the application shall be used for post-admission operations related to ① academic affairs (registration, study guidance, etc.), ② student support (health care, application for tuition exemption/scholarship, career support, etc.), ③ tuition collection work, and ④ statistical survey and data analysis.

(3) Only the examinee's numbers, names and addresses of successful applicants may be used for contact with the Alumni Association or Co-op as an affiliated organizations. If successful applicants do not wish to have any contact with these organizations, inform the office below.

Contact: Examination Section of Admissions Office, Academic and Student Affairs Section, Schools of Science, Engineering, and Sustainable Design, University of Toyama, 3190 Gofuku, Toyama City, Toyama Prefecture, 930-8555, Japan

(4) University of Toyama may have contractors do some kind of university operations. When conducting the operations, all or part of the personal information obtained shall be provided to the contractor within the limit necessary to perform the operations, however, University of Toyama supervise the use of information to ensure compliance with confidentiality.

8. Precautions

(1) If any submitted application document is incomplete, the application may not be accepted.

(2) If the examination fee is not fully paid, the application will not be accepted.

(3) Once an application has been filed, any changes to the documents will not be accepted.

(4) Accepted application documents will not be returned for any reason.

(5) Be sure to bring the Examination Card with you when taking the examination.

(6) Those who failed to take any part of the designated examination will be excluded from the process of selection for admission.

(7) Even after admission has been granted, if any discrepancy is found with the information in the submitted documents, the admission may be cancelled.

(8) For inquiries related to the application and other matters, contact:.

Examination Section of Admissions Office, Academic and Student Affairs Section,
Schools of Science, Engineering, and Sustainable Design, University of Toyama
3190 Gofuku, Toyama City, Toyama Prefecture 930-8555, Japan

Phone: 076-445-6399

9. Preliminary Consultation for Applicants with Disabilities

Applicants with disabilities who wish to receive special consideration to take the admission examination and study are requested to consult with the Examination Section of Admissions Office, Academic and Student Affairs Section, Schools of Science, Engineering, and Sustainable Design before filing the application.

Applicants for the Preliminary Consultation may need to submit a medical certificate issued by a doctor and documents specifying following information.

- Type(s) of disabilities and the degree of severity
- Items for special arrangements required during the entrance examination
- Items for special arrangements required in classes after enrollment
- Situation of daily life and other related information

[1] Consultation deadline

Test category	Application deadline
(First recruitment including admission in October 2022) Admission Examination for International Students	16:00 on Thursday, June 30, 2022
(Second recruitment) Admission Examination for International Students	16:00 on Wednesday, November 9, 2022

[2] Contact: Examination Section of Admissions Office, Academic and Student Affairs Section, Schools of Science, Engineering, and Sustainable Design, University of Toyama
3190 Gofuku, Toyama City, Toyama Prefecture 930-8555, Japan
Phone: 076-445-6399

Requirements for Applicants in association with Measures against the Novel Coronavirus Infection Diseases

1 Precautions to prevent infection

Keep the prevention of infection in mind in everyday life, and measure the body temperature in the morning to check for changes in physical condition.

(Reference) For Examinees - Precautions for Preventing the Novel Coronavirus Infection -
https://www.mext.go.jp/content/20201218-mext_daigakuc02-000005144_1.pdf

2 Medical checkup at a medical institution

Examinees who have symptoms such as fever, coughs, etc. from approximately 2 weeks before the day of the admission examination are requested to have a medical checkup at a medical institution in advance.

3 Applicants who cannot be permitted to take the admission examination

Applicants who are infected by the Novel Coronavirus and hospitalized or under medical treatment at home or an accommodation facility on the day of the admission examination cannot be permitted to take the admission examination. Since a close contact person (a person who has been informed by the Public Health Center that "he/she is identified as a close contact person") without symptoms such as fever, coughs, etc. he/she may be permitted to take the admission examination under certain conditions, contact the office below in advance.

Applicants who entered Japan from abroad to take the admission examination cannot be permitted to take the admission examination during the waiting period after entry into Japan.

Contact: Examination Section of Admissions Office, School of Science, Academic and Student Affairs Division of Science and Engineering, University of Toyama, 3190 Gofuku, Toyama City, Toyama Prefecture, 930-8555, Japan
Phone: 076-445-6399

4 Response on the day of the admission examination

- Examinees who have symptoms such as fever, coughs, etc. and a fever of 37.5°C or higher measured on the day of the admission examination will be requested not to take the admission examination. Examinees who have symptoms such as fever, coughs, etc. and a fever of 37.4°C or lower measured on the day of the admission examination will need to report the condition to the examination supervisors.
- Regardless of whether examinees have symptoms above mentioned, they will be requested to bring a mask (a plain, white or light color mask is recommended; if it is difficult to wear a mask for some reason, consult with the office below in advance)

and wear it at all times except during the lunch time. Avoid contact and conversations with other examinees wherever possible during breaks, lunch time, and at the time of entering and leaving the admission examination venue. However, examinees may be instructed to remove their masks to check their identity during the admission examination.

- Be sure to bring plastic bags to put used masks etc. in.
- Examination supervisors and staff on the admission examination venue will also wear masks.

Contact: Examination Section of Admissions Office, School of Science, Academic and Student Affairs Division of Science and Engineering, University of Toyama, 3190 Gofuku, Toyama City, Toyama Prefecture, 930-8555, Japan
Phone: 076-445-6546

5 Clothes or lunch on the day of the admission examination

On the day of the admission examination, there will be times when windows are opened to ventilate the admission examination rooms. Thus, be careful with air temperature of the day and bring warm clothes, such as a jacket. Since cafeterias or shops are not available on the admission examination venue on the day, examinees will be requested to bring their own lunch and eat it at their own desks within the designated time.

6 Disinfection and disposal of garbage

Disinfectant solutions will be installed on each admission examination venue on the day of the admission examination. Examinee will be requested to disinfect their hands when entering or leaving the admission examination venue. Be sure to put used masks or tissues after blowing the nose in a plastic bag, seal it, and throw it in a trash can.

7 Immunization

In order to reduce the risk of suffering infectious diseases, it is recommended that examinee should get appropriate vaccinations at their own discretion.

8 Implementation of new lifestyle

In daily life, thoroughly implement basic measures against infectious diseases, including the avoidance of the 3 Cs, namely, closed spaces with poor ventilation, crowded places with many people nearby, and close-contact settings, as well as keeping distance between people, wearing a mask, and practicing hand and finger sanitization such as handwashing. In addition, keep in mind to manage own physical condition, such as taking well-balanced meals, doing moderate exercise, and getting enough rest and sleep.

9 Report

Examinees who fall under “3 Applicants who cannot be permitted to take the admission examination” or who have a fever of 37.5°C or higher measured on the day of the admission examination will need to promptly report it to the office below. Examinees who are found to be in poor physical condition within 14 days after the admission examination will also need to report it to the office below.

Contact: Examination Section of Admissions Office, School of Science, Academic and Student Affairs Division of Science and Engineering, University of Toyama, 3190 Gofuku, Toyama City, Toyama Prefecture, 930-8555, Japan
Phone: 076-445-6546

10 Waiting room

On the day of the admission examination, there will be no waiting room for examinees and their attendants.

11 Download of the Application

It is recommended to download the COVID-19 Contact-Confirming Application (COCOA) in advance.

Note that an examinee who receives notification from the application will not be immediately identified as a close contact person.

Outline of the Graduate School of Science and Engineering (Master's Course)

1. Purpose

The Graduate School of Science and Engineering aims to nurture highly specialized professionals who enable innovation that transcends the boundary between science and engineering fields by acquiring not only basic abilities in a wide range of studies and advanced specialized knowledge, but also good ethics and creativity to develop something new.

2. Requirements for Completion

A master's degree will be awarded to students who have been enrolled in the Graduate School of Science and Engineering of the University for 2 years or more, have acquired 30 or more credits from the designated courses of each program, and have passed the dissertation review.

However, with regard to the period of enrollment, if a student has achieved excellent research results, a master’s degree will be awarded to the student on condition that he/she is enrolled in the Graduate School of Science and Engineering for at least 1 year.

The degrees awarded in each program are as follows:

(Degree to be awarded)

Mathematics and Informatics Program	Master of Mathematics and Informatics
Physics and Applied Physics Program	Master of Science and Engineering
Life Science and Material Chemistry Program	Master of Science and Engineering
Earth, Life, Environmental Science Program	Master of Science
Mechatronics Program	Master of Engineering
Materials Science and Engineering Program	Master of Engineering
Civil Design and Engineering Program	Master of Engineering
Advance Clean Energy Program	Master of Science and Engineering

3. Long-term Study System

Long-term study system is for student who has a full-time occupation and difficulty completing his/her Master’s Course within the standard study period because of restricted time for class attendance or conducting research. The

student may extend the study period of up to 4 years.
If application is approved at the time of admission, the student will pay the total amount of the tuition fee of 2 years evenly divided for each semester in the period approved.

The details of the Long-term study system, including the application method, will be informed when we send the documents for the admission procedure by mail.
Note that applications may not be approved.

4. Fields of Education, Teaching Staff in Charge and Research Overview

(Note) 1. ○ indicates a faculty member who can be your advisor.
2. Faculty members marked with an asterisk (*1) are scheduled to retire in March 2023. Faculty members marked with an asterisk (*2) are scheduled to retire in March 2024.

(1) Mathematics and Informatics

Field of Education	Academic Advisor	Research Overview
Mathematical Analysis	Prof. Masato Kikuchi○ Prof. Takashi Koda○ Prof. Setsuo Nagai○ Prof. Keiko Fujita○ Associate Prof. Tatsuya Kawabe○ Associate Prof. Iwao Kimura○	Number theory, Differential geometry, Topology, Complex analysis, Real analysis, and so on.
Mathematical Science of Information	Prof. Yasuhiro Fujita○ Prof. Hiroyuki Yamane○ Prof. Kei-ichi Ueda○ Associate Prof. Masakazu Akiyama ○ Associate Prof. Hideo Deguchi○	Algebra, Theory of functional equations, Applied analysis, Numerical analysis, Probability theory, and so on.
Computer Software System	Prof. Shigeki Hirobayashi○ Associate Prof. Tadanobu Misawa○	We conduct education and research on digital signal processing and its applications. Signals of interest include audio, imaging, economics, finance, cosmic rays, biological signal, and, many others. The processing of such signals includes denoising, compression, visualization techniques, and brain-computer interfaces.

Medical Information Sensing	Prof. Hideyuki Hasegawa○ Associate Prof. Ryo Nagaoka○	We conduct education and research on the theory and applications of noninvasive ultrasonic imaging and sensing of morphological and functional information of biological bodies. In particular, we develop advanced signal- and image-processing techniques, such as ultrasonic beamforming, target motion estimation, and tissue viscoelasticity estimation, for ultrasonic measurements.
Biological Information Processing	Prof. Toshihide Tabata○ Associate Prof. Mamoru Takamatsu○	We conduct education and research in bioinformatics. We investigate the relationship between gene sequence, protein structure/function, eural/cardiac function, behavior, and disease using computer protein structure modeling, in-silico pathogenicity prediction, and electrophysiological/behavioral measurements. We also conduct education and research on visual information processing engineering, color engineering, evaluation and analysis of CG/3-D visible images, optical and visual environment engineering, traffic visual environment engineering, urban landscape lighting, and the development of universal designs for elderly persons and people with synesthesia.
Information Communication Networks	Prof. Koji Kikushima○*2	We conduct education and research on optical signal processing, transmission systems for the signals of emergency events such as earthquakes, modulation systems, transmission systems, optical communication systems, and information communication networks.

Artificial Intelligence	Prof. Zheng Tang○*2 Associate Prof. Shangce Gao○	We conduct education and research on the design, analysis, and evaluation of various artificial intelligent methodologies, including the artificial neural networks which are inspired by the human brain's architecture and information processing mechanisms, the deep learning which is able to learn by itself, particle swarm optimization, ant colony optimization, error back-propagation method, genetic algorithm, evolutionary strategy, and other machine learning technologies.
Quantum Information	Prof. Kiyoshi Tamaki○	We are working on quantum information where application of quantum mechanics offers revolutionary improvements to information processing. In particular, we are aiming at the realization of quantum communication, such as quantum key distribution and quantum repeaters.
Computational Biophotonics	Prof. Takashi Katagiri○ Associate Prof. Yusuke Oshima○	We conduct research and education aimed at creating basic principles of next-generation medical measurement and diagnostic technology and building an academic system by combining photon science, laser spectroscopy, optical communication technology and information science.
Human-Computer Interaction	Prof. Takayuki Nozawa○	We conduct education and research on the analysis and evaluation of human cognition and social interaction, and on the design of information technologies that support people's intellectual activities in real life. For this purpose, we use a combination of multimodal measurement of brain, psychological, physiological, and behavioral activities with data science and artificial intelligence techniques.

(2) Physics and Applied Physics

Field of Education	Academic Advisor	Research Overview

Solid State Physics	Prof. Tomohiko Kuwai○ Associate Prof. Takashi Tayama○ Assistant Prof. Yuji Matsumoto	Magnetic, electrical and thermal properties of condensed matter including strongly correlated electron systems at low temperatures.
Nanophysics	Prof. Hiroyuki Ikemoto○ Associate Prof. Keisuke Hatada○	Structures and properties of nanoparticles and disordered systems.
Theoretical Physics	Prof. Takeshi Kurimoto○ Associate Prof. Mitsuru Kakizaki○ Assistant Prof. Nagisa Hiroshima	Theoretical elementary particle physics, cosmology and related topics.
Microwave Physics	Prof. Kaori Kobayashi○ Associate Prof. Katsunari Enomoto○	Microwave and laser spectroscopy of molecules; Control of molecular motion.
Laser Physics	Prof. Yoshiki Moriwaki○ Associate Prof. Kazuhiro Yamamoto○	Development of coherent light sources and their application to precise optical measurements, spectroscopic works and gravitational wave detection.
Nanoelectronics Engineering	Associate Prof. Masayuki Mori○	We study fabrication processes, epitaxial growth, and characterization technologies for semiconductor devices in order to realize next-generation high-performance integrated circuits.
Electron Device Engineering	Prof. Hiroyuki Okada○ Associate Prof. Toshio Kikuta○	We conduct education and research in the physics and electro-optics of organic materials, the basic science and technology of electron devices, and light quantum computing applications, e.g., in liquid crystal devices, organic light-emitting devices, organic- based transistors, organic sensing devices, organic-based solar cells. The physical properties, crystal structure and its applications of single crystals, thin films and nanomaterials of ferroelectrics and oxide semiconductors are also investigated.
Organic Optical Device Engineering	Prof. Shigeki Naka○	We conduct education and research on optical and electrical properties, structure control, electro-optical conversion, optical-electrical conversion of organic electronic materials, and their applications based on optical control, e.g. organic light-emitting devices, organic photodiodes, organic photovoltaic cells, and other organic optical devices.

Microstructure Control Engineering	Prof. Kenji Matsuda○ Associate Prof. Seungwon Lee Assistant Prof. Tsuchiya Taiki	The microstructure control engineering course is focused on establishing and designing new metallic materials for energy saving and environmental conservation. Research topics also include advanced microstructure control technologies using high-resolution transmission electron microscopy and scanning electron microscopy.
Solid State Engineering	Prof. Katsuhiko Nishimura○*1 Associate Prof. Takahiro Namiki○	We conduct education and research on the electric, magnetic, and thermal properties of superconductors, magnetic materials, and cryogenic materials of alloys, intermetallic compounds, and conductive oxides to achieve improved performance and applications of the materials.
Metallurgical Engineering of Iron and Steel Materials	Prof. Hideki Ono○	Targets of education and research are elemental technologies of the production of high performance iron and steel materials. The main subjects are 1) energy saving and reduction of environmental loads in iron- and steel-making processes, 2) development of high purity refining method, 3) control of inclusions in steel, and 4) Recycling of ferrous scraps.
Computational Materials Engineering	Prof. Norio Nunomura○	In order to understand and apply the diversity and complexity of the microscopic structure of materials, we conduct education and research on material design, structural analysis and functional prediction from atomic scale using computer simulation.
Plasma Physics	Associate Prof. Yasuhiro Nariyuki○	Nonlinear and nonequilibrium phenomena in plasmas, and application of mathematical modeling
Atomic and molecular physics	Prof. Yasumasa Hikosaka○ Lecturer Hayato Ohashi	We deepen the understanding of fundamental atomic and molecular processes induced by collisions with short-wavelength light and highly-charged ions, and conduct education on the physics of few-quantum many-body systems.

Fluid Geophysics	Prof. Kazuma Aoki Associate Prof. Wataru Shimada	Research on the phenomena of changes in the atmosphere, oceans, land, and cryosphere that constitute the Earth's climate system and their interactions, and environmental science research on the physical properties of snow, ice, and clathrate hydrates and atmospheric particulate matter by physical methods
Communication Systems Engineering	Associate Prof. Kazuhiro Honda	Education and research will be conducted on advanced use of computers, development of new frequency resources, and communication systems, including electromagnetic field analysis, signal processing, communication and network-related technologies, and devices and measurement systems operating in the short millimeter and terahertz wave bands, which are unexplored areas.

(3) Life Science and Material Chemistry

Field of Education	Academic Advisor	Research Overview
Physical Chemistry	Prof. Koichi Nozaki○ Associate Prof. Honoh Suzuki○ Lecturer Munetaka Iwamura	Photophysics and photochemistry of luminescent organic compounds or transition-metal complexes using ultrafast laser spectroscopy. Solution chemistry and thermodynamics for potential applications in medicine and optical devices.
Coordination Chemistry	Prof. Kiyoshi Tsuge○ Associate Prof. Hideki Ohtsu○	Coordination compounds, being composed of metal ions and organic/inorganic ligands, have huge diversity and potential. In this laboratory, coordination compounds with novel structures and properties are being prepared. Our interests are divided into three areas: 1. emissive coordination complexes; 2. multinuclear complexes that respond to external stimuli; and 3. functional complexes, inspired by renewable energy conversion in nature, which exhibit catalytic activity toward the reduction of CO_2, O_2, and N_2.

Organic Chemistry	Prof. Naoto Hayashi○ Assistant Prof. Zyunro Yoshino	We synthesize numerous compounds with new, hitherto unknown properties, and then investigate the intricacies of their structures. Some of the compounds we have created include fragrant compounds and emerald crystals. The nature of such compounds and their molecular structure are intimately related. Currently, we are developing compounds that are highly responsive to heat, light, and magnetic fields.
Natural Products Chemistry	Associate Prof. Masahiro Miyazawa○ Lecturer Hajime Yokoyama	Numerous bioactive organic compounds occur in nature, many of which possess complex structures with large numbers of asymmetrical carbon atoms. We are developing useful reactions for the synthesis of such complex-structured organic compounds, and applying these compounds to the synthesis of bioactive natural products.
Biofunctional Chemistry	Prof. Yoshiya Ikawa○ Lecturer Shigeyoshi Matsumura	RNAs play versatile roles in biological systems because they not only serve as a genetic material but also act as functional molecules. We study the molecular basis of naturally occurring RNAs with catalytic and receptor functions. Another interest of our group lies in the artificial generation of RNAs with desirable functions through rational and evolutional approaches.
Engineering based on Genetic Information	Prof. Nobuyuki Kurosawa○ Project Assistant Prof. Sei-ichi Koike Assistant Prof. Maki Moriwaki	We conduct education and research to understand the molecular bases of human diseases from molecular-genetic and immunological viewpoints. We apply this knowledge to the development of biotechnology.
Pharmacology	Associate Prof. Ichiro Takasaki○	Our aim is to provide researchers and engineers with the knowledge and technology of pharmacology and genetic engineering. Our research group aims to elucidate the mechanisms of chronic pain and neuropsychiatric disorders and develop new medications against them.

Biological Chemistry	Lecturer Michio Sayama	We investigate the relationship between the metabolism of a drug or toxin and the expression of drug efficacy or toxicity, the purification of metabolic enzymes, the conversion of environmental pollutants to useful materials using enzymes or microorganisms, and the application of enzymes to organic syntheses and analytical chemistry.
Bioelectronics and Bioelectrical Engineering	Prof. Hiroaki Shinohara○*2 Assistant Prof. Minoru Suga	Research and education concerning the interdisciplinary region between bioscience and electrochemical or electrical engineering are conducted. Enzyme sensors and cell-based biosensors for medical diagnostics and pharmaceutical tests are studied. Basic and applied research of various electrical treatments of microorganisms and mammalian cells are also studied.
Brain and Neural Systems Engineering	Prof. Shigenori Kawahara○	From a biophysical view on the rules underlying the function of brain and neural system, we investigate the mechanisms of learning and memory, using neural recording and pharmacological techniques, and conduct education and research on engineering applications of neural network dynamics.
Biomedical Engineering for regenerative medicine	Prof. Makoto Nakamura○*2 Assistant Prof. Shintaro Iwanaga	We are conducting education and research on advanced tissue engineering and regenerative medicine based on biomaterial, biomedical engineering and other multi-disciplinary approaches. We are particularly focusing on the development of advanced methodologies for organ engineering and organ regeneration.
Bio-functional Molecule Engineering	Prof. Naoki Toyooka○ Assistant Prof. Takuya Okada	The principal focus of this group is the development of the design and synthesis procedure of small molecules, as well as their biological evaluation as candidates in drug discovery.

Process Systems Engineering	Associate Prof. Taketoshi Kurooka○	We conduct education and research on process systems engineering, which addresses the optimal design, operation, and control of complex systems, such as chemical, biochemical, petrochemical, and pharmaceutical processes.
Protein System Engineering	Associate Prof. Tomonao Inobe○	Proteins are necessary for virtually every activity in the human body. Our goal is to understand how proteins are produced and degraded in the cell in terms of protein science and biophysics. Based on the above knowledge, we also aim to develop novel technologies that can regulate the lifespans of proteins for various practical applications.
Catalysis, Energy and Material Engineering	Prof. Noritatsu Tsubaki○ Associate Prof. Guohui Yang○	We research the development of environmentally friendly catalysis processes, the green utilization of natural resources including biomass and sunlight, the development of alternative energy instead of petroleum, and novel nanomaterials.
Environmental and Functional Molecular Chemistry	Prof. Shigehiro Kagaya○ Associate Prof. Makoto Gemmei○	Education and research are conducted on the following: 1) synthesis of materials containing functional molecules and polymers, 2) establishment of techniques using these materials for separation and preconcentration of elements, and 3) application of the techniques to environmental analysis, treatment of wastewater, and recovery of rare elements. Research on the adsorption and desorption behaviors of materials at the solid-liquid interface, including the development of surface modification techniques and antifouling materials, is also conducted.

Applied Inorganic Chemistry	Prof. Sen-ichi Aizawa○ Associate Prof. Akira Miyazaki○	Physiological and pharmacological studies have revealed the sophisticated functions of metal complexes, which may be related to their molecular structures and electronic states. From the perspective of the engineering applications of such functions, education and research are performed to develop highly functionalized materials and chemicals produced with metal complexes and their aggregates.
Computers and Applied Chemistry	Associate Prof. Tatsuya Ishiyama○	The recent rapid development of computer technology has enabled us to analyze and predict various chemical reactions and molecular dynamics based on computational chemistry. This class summarizes the basic theory of ab initio electronic structure calculations, such as molecular orbital and density functional methods.
Biomolecular Chemistry	Associate Prof. Masafumi Sakono○	Organic chemistry has been vigorously applied to molecular biology. Our objectives are to reveal the properties of biomolecules using various methods based on chemical biology. We also engage in the development of new techniques for the analysis of intermolecular interactions, such as protein-protein interactions.
Synthetic and Medicinal Chemistry	Prof. Hitoshi Abe○	This field focuses on creation of novel “functional organic molecules” based on the advanced synthetic organic chemistry. The newly designed organic molecules possess some potential to contribute to various fields of science such as discovery of novel medicines and agrichemicals. Research in our group is primarily aimed toward the development of catalytic reactions and methods for organic synthesis for the functional organic molecules.

Environmental Analytical Chemistry	Prof. Koji Tohda○	We conduct educational research on the design and synthesis of highly functional optical sensor molecules for the sensing of metabolites, such as glucose or lactate, and ions, such as potassium or sodium, in the human body, and the application of such molecules in a novel optical sensing system for the minimally invasive monitoring of vital ions and metabolites as a tool for biochemical and clinical analyses.
Colloid and Interface Chemistry	Associate Prof. Kensaku Ito*2	We focus on teaching the basic theory on the interfaces that form common boundaries between two phases, such as gas/liquid, liquid/solid, and solid/gas. Basic studies investigating unknown phenomena in dispersions of nanometer- to micrometer-sized particles and applied research in the development of new optical materials and porous materials are conducted.
Biomaterial Designing and Engineering	Associate Prof. Tadashi Nakaji○	In our research field, the design of biomaterials and the construction of concept for the regenerative medicine are conducted in based on protein engineering, polymer science, cell biology, and molecular biology. Especially, we aim to construct functional biomaterials such as screening devices for various diseases and supporting materials for cell transplantation to cure otherwise intractable disorders.
Environmental Chemical Measurement	Prof. Hideki Kuramitz	Development of analytical methods for trace constituents in water and removal methods for toxic constituents in wastewater, research on origin, circulation, and distribution of substances using trace elements and isotopes, etc.
Hydrogen Isotope Science	Prof. Takayuki Abe Prof. Yuji Hatano Associate Prof. Masanori Hara Associate Prof. Hidehisa Hagiwara Lecturer Akira Taguchi Assistant Prof. Satoshi Akamaru	Research on hydrogen isotope functionality and functional materials as fuels for hydrogen energy and fusion reactors Research on isotope effects of hydrogen and tritium decomposition effects

(4) Earth, Life, Environmental Science

Field of Education	Academic Advisor	Research Overview
Structural Biology	Associate Prof. Yuji Yamazaki○ Associate Prof. Kiyoto Maekawa○ Associate Prof. Tsutomu Tsuchida○ Assistant Prof. Kyoko Sato	Morphology, phylogenetic systematics, and population dynamics of insects, fishes, birds, and mammals. Community structures and dynamics of insects and their symbiotic microorganisms.
Cell Biology	Prof. Tatsuya Wakasugi○ Prof. Ichirou Karahara○ Lecturer Masayuki Yamamoto Assistant Prof. Daisuke Tamaoki	Genome structure and functions; Environmental effects on development of plant organ, tissue, and cells; plant molecular genetics.
Regulatory Biology	Prof. Kouhei Matsuda○ Prof. Takatoshi Mochizuki○ Lecturer Norifumi Konno Lecturer Tomoya Nakamachi Assistant Prof. Eri Morioka	Physiology and biochemistry of functional peptides and their receptor signaling in fishes, amphibians, and mammals; sleep regulations, circadian rhythms and photoperiodism in insects and mammals; genetic manipulation and behavioral analysis.
Environmental and Analytical Chemistry	Prof. Jing Zhang○ Prof. Hideki Kuramitz○ Prof. Keiji Horikawa○ Assistant Prof. Kazuto Sazawa Assistant Prof. Tamihisa Ota Project Assistant Prof. Takanori Kagoshima	Environmental/analytical chemistry; geochemical engineering; geochemistry; paleoceanography; marine chemistry; bio/chemical sensor
Environmental Biology	Prof. Daisuke Tanaka○ Prof. Naoya Wada○ Prof. Yasushi Yokohata○ Prof. Hiroshi Ishii○ Associate Prof. Hiroyuki Kamachi○ Associate Prof. Kenji Kashiwagi○ Lecturer Akihiro Sakatoku	Environmental biology; ecology; plant-animal interactions; microbiology; plant physiology; conservation biology
Solid Earth Geophysics	Prof. Tohru Watanabe○ Prof. Naoto Ishikawa○ Prof. Akio Katsumata○ Associate Prof. Kazuo Kawasaki○ Assistant Prof.Kohei Hotta	Physics of Earth's interior, Seismology, Geodesy, Paleomagnetism, Environmental magnetism
Geophysical Fluid Dynamics	Prof. Kazuaki Yasunaga○ Prof. Kazuma Aoki○ Prof. Konosuke Sugiura○ Prof. Bunmei Taguchi○ Prof. Masahiro Hori○ Associate Prof. Wataru Shimada○ Associate Prof. Atsushi Hamada○	Meteorology; climate dynamics; atmospheric physics; ocean dynamics; glaciology; interaction of atmosphere, hydrosphere and lithosphere; cryosphere science; solid-state physics and environmental science of ice and snow; nucleation and growth of clathrate hydrates.

Geological Science	Prof. Kosei Komuro○*2 Prof. Shigeru Otoh○ Prof. Yasuo Ishizaki○ Prof. Shin-ichi Sano○ Associate Prof. Ken-ichi Yasue○ Associate Prof. Ryo Tateishi	Earth system history; engineering geology; geoinformatics; hazard geology; mineral sciences; paleontology; petrology; resource geology; sedimentary geology; seismogeology; tectonics and geochronology; volcanology.

(5) Mechatronics

Field of Education	Academic Advisor	Research Overview
Electric Power System Engineering	Prof. Hiroaki Ito○ Assistant Prof. Taichi Takezaki	We conduct education and research on advanced high voltage and plasma engineering, such as pulsed power technology and its application to intense pulsed particle beam, high-density pinched plasma and atmospheric pressure plasma for applications to nuclear fusion, material and environmental fields. We also study research related to development of high-power microwave, laboratory astrophysics, and lightning observation.
Advanced Power Systems (Joint Research Chair)	Prof. Toshio Inoue Assistant Prof. Akira Koide	Education and research will be conducted on advanced analytical methods required for the stable operation and planning of power grids in the future, including methods for evaluating the impact of the mass introduction of renewable energy on power quality and grid stability, which has been attracting increasing attention in recent years toward the realization of carbon neutrality, and countermeasures.
Energy Conversion Engineering	Prof. Takahisa Ohji○ Associate Prof. Kenji Amei○	We conduct education and research on applied electromagnetic technologies such as magnetic levitation, magnetic bearings, linear motors and actuators, and power electronics technologies, which are indispensable for natural energy generation and high-efficiency power conversion in the interconversion of electrical energy and mechanical energy.

Dynamical Systems and Robotics	Prof. Kenji Hirata○ Associate Prof. Hideki Toda○ Assistant Prof. Tam Willy Nguyen	Our education and research activities focus on dynamical systems, control and robotics. The topics include decentralized control, hybrid systems and networked control as well as autonomous mobile robots, bio-inspired robots, rehabilitation robots.
Wave Communication Engineering	Associate Prof. Masafumi Fujii○	Education and research are conducted in basic and applied fields of electromagnetic (EM) wave including metamaterials, interaction between human body and EM wave, radio wave anomaly associated with earthquakes, as well as their massively-parallel super-computation from nano to earth-scale ranges.
Communication Systems Engineering	Associate Prof. Tatsuo Nozokido○ Associate Prof. Kazuhiro Honda○	We conduct education and research on the advanced utilization of computers and the development of new frequency resources and communication systems, such as electromagnetic field analysis, signal processing, network connection techniques, and millimeter-wave and terahertz engineering.
Bio-Information Engineering	Prof. Kazuki Nakajima○ Lecturer KIM Juhyon	We conduct education and research in a wide range of bio-information systems, such as the methods of analyzing and measuring biological information and the development of health-care devices, considering both hardware and software, which are based on measurement, control, information processing, and system engineering.
Measurement Systems Engineering	Prof. Masayasu Suzuki○	We conduct education and research on small and integrated measurement systems developed using advanced technologies in biotechnology and electronics, such as integrated miniature biosensors, biochips, and microarrayed chips for medical diagnostics and environmental monitors.

Nanoelectronics Engineering	Prof. Koichi Maezawa○ Associate Prof. Masayuki Mori○	We study semiconductor nanodevices, Micro Electro Mechanical Systems (MEMS), and their applications. Resonant tunneling devices and terahertz integrated circuits based on them are among the most active research subjects. We also study fabrication processes, epitaxial crystal growth, and characterization technologies for semiconductor devices in order to realize next-generation high-performance integrated circuits.
Electron Device Engineering	Prof. Hiroyuki Okada○ Associate Prof. Toshio Kikuta○	We conduct education and research in the physics and electro-optics of organic materials, the basic science and technology of electron devices, and light quantum computing applications, e.g., in liquid crystal devices, organic light-emitting devices, organic- based transistors, organic sensing devices, organic-based solar cells. The physical properties, crystal structure and its applications of single crystals, thin films and nanomaterials of ferroelectrics and oxide semiconductors are also investigated.
Organic Optical Device Engineering	Prof. Shigeki Naka○ Associate Prof. Masahiro Morimoto○	We conduct education and research on optical and electrical properties, structure control, electro-optical conversion, optical-electrical conversion of organic electronic materials, and their applications based on optical control, e.g. organic light-emitting devices, organic photodiodes, organic photovoltaic cells, and other organic optical devices.

Solid Mechanics	Prof. Katsuyuki Kida○ Associate Prof. Koshiro Mizobe○ Assistant Prof. Takahiro Matsueda	We focus on mechanical structures under complex physical conditions. Their behaviors are linked to stresses, displacements, and fracture thresholds of the structures. We conduct education and research based on the quantitative evaluation of the fracture process and the investigation of fracture mechanisms using experimental methods, observations, and numerical analysis.
Reliability Engineering	Prof. Noriyasu Oguma○ Associate Prof. Kenichi Masuda○	Based on theory that combines micro- and macro-scale approaches to strength and fracture mechanism of machinery, education and research on structural design, fatigue design, and safe/reliability evaluation methods are conducted for structural materials, functional materials and medical materials.
Advanced Materials and Forming	Prof. Tomomi Shiratori○ Lecturer Noboru Takano Assistant Prof. Tatsuya Funazuka	We conduct education and research on the optimal design and applications of machining tools, based on improving the required plasticity characteristics and working processes of various structural and functional materials, involving the control of materials compositions and the analysis of plastic deformation.
Thermal Engineering	Associate Prof. Koichi Kasaba○ Assistant Prof. Akio Kosaka	For strength evaluation of structural components for cryogenic temperature and electrical and mechanical properties evaluation of superconducting materials, we conduct education and research on the basics and applications of Material mechanics, Fracture mechanics, Heat transfer engineering and Superconducting engineering.
Fluid Mechanics	Prof. Seiichiro Izawa○ Lecturer Atsushi Kase	In addition to basic issues such as flow instability, turbulence, and flow around objects, education and research will be conducted on applied issues such as insect flight, in vivo flow, and effective use of natural energy.

Intelligent Machine	Prof. Yoshiyuki Matsumura○ Lecturer Masahiro Sekimoto	For the development of advanced mechatronics intended to create high-precision, high-speed, high-response machinery, we conduct education and research on dynamical analysis and the configuration and design of new mechanical systems.
Control System	Associate Prof. Toshiyuki Yasuda○ Assistant Prof. Tomohiro Hayakawa	We conduct education and research on development of control systems such as human cooperation robot systems considering human emotion, visual servo systems based on image processing technology, and swarm systems using evolution and learning approaches.
Mechanical Information and Instrumentation	Prof. Tohru Sasaki○ Associate Prof. Kenji Terabayashi○	Our aim is image-position measuring of large-scale environments and force sensing for micro-handling. We conduct education and research on the development of new measuring methods, systems, and sensors. We also focus on robotic vision systems including 3D measurement and object recognition based on image processing.
Applied Mechano-Informatics	Prof. Takeshi Seta○ Lecturer TATIANA Zolotoukhina Lecturer Daisuke Watanabe	We conduct education and research on numerical analysis and simulation technology utilizing computers, to clarify and control various physical phenomena/property in mechanical engineering problems such as atomic and molecular motion, a multiphase flow, and a turbulent flow.

(6) Materials Science and Engineering

Field of Education	Academic Advisor	Research Overview
Materials Forming and Engineering	Prof. Seiji Saikawa○	We conduct education and research related to the processing and design of fabricated materials based on the phase transition from liquid to solid, through the development and application of melting, casting, and solidification techniques of metal and the forming of materials, to produce high-performance and high-function fabricated materials.

Microstructure Control Engineering	Prof. Kenji Matsuda○ Associate Prof. Seungwon Lee○ Assistant Prof. Taiki Tsuchiya	The microstructure control engineering course is focused on establishing and designing new metallic materials for energy saving and environmental conservation. Research topics also include advanced microstructure control technologies using high-resolution transmission electron microscopy and scanning electron microscopy.
Functional Material Design Engineering	Prof. Atsushi Saiki○ Associate Prof. Takashi Hashizume○	Education and synthetic research and development are conducted on the functional materials of ceramics, metals, and new complex materials through designing, structural control, combining additives such as rare earth metals, improving fabrication processes, and evaluating their properties and applications.
Materials Environment and Surface Processing	Associate Prof. Masahiko Hatakeyama○	In order to improve the corrosion resistance of metal materials, we investigate and instruct about electrochemical methods in various alloys. We focus especially on the characterization of passivation films and functional films that are fabricated by electrochemical methods.
Solid State Engineering	Prof. Katsuhiko Nishimura○*1 Associate Prof. Takahiro Namiki○	We conduct education and research on the electric, magnetic, and thermal properties of superconductors, magnetic materials, and cryogenic materials of alloys, intermetallic compounds, and conductive oxides to achieve improved performance and applications of the materials.

Materials Processing Engineering Laboratory	Prof. Toshiya Shibayanagi○ Associate Prof. Masamichi Yoshida○ Assistant Prof. Takeshi Yamane	Targets of education and research in this laboratory are the key fundamental processes for industrial products, starting from the designing of materials addressing the control of phenomena in materials through elucidating their mechanisms, and optimizing their related production processes. The main subjects are 1)heat and mass transfer phenomena, 2)visualization techniques, 3)surfaces and interfaces, and 4)joining and welding.
Metallurgical Engineering of Iron and Steel Materials	Prof. Hideki Ono○	Targets of education and research are elemental technologies of the production of high performance iron and steel materials. The main subjects are 1) energy saving and reduction of environmental loads in iron- and steel-making processes, 2) development of high purity refining method, 3) control of inclusions in steel, and 4) Recycling of ferrous scraps.
Computational Materials Engineering	Prof. Norio Nunomura○	In order to understand and apply the diversity and complexity of the microscopic structure of materials, we conduct education and research on material design, structural analysis and functional prediction from atomic scale using computer simulation.
Photofunctional Material	Prof. Yutaka Takaguchi○	Education and research are conducted into the design and synthesis of new photofunctional materials based on surface-modified nanomaterials that enable hybridization with organic or inorganic materials so that they can be used in the development of artificial photosynthesis systems and applications in the field of nanomedicine.
Materials Plasticity Engineering	Prof. Tetsuo Aida○ Assistant Prof. Tadayoshi Tsukeda	For various industrial materials, we conduct education and research on molding methods, plastic working deformation behavior and applications of molding materials controlled by advanced processing technology.

Engineering for Reaction Design	Prof. Satoru Murata	We conduct education and research related to the design of reactions for the highly effective conversion and utilization of petroleum-derived materials from engineering perspective.
Design of Lightweight Structural Materials	Prof. Takuya Ishimoto○	To create materials that meet the ever-increasing demands of society, education and research are conducted on the design of multifunctional metallic materials that are not only lightweight and strong, but also have multiple functionalities such as corrosion resistance and biological functions, based on the superposition of structure/shape and microstructure control.

(7) Civil Design and Engineering

Field of Education	Academic Advisor	Research Overview
Hydraulic Engineering for Environment and Disaster Prevention	Prof. Ichiro Kimura○	Research on hydraulics in rivers, coastal and lakes focusing on the environment and disaster prevention by means of field observation, laboratory experiments and computer simulations. Education on the ability to carry out the above studies including fluid mechanics, hydraulics, river engineering and computational techniques.
Geotechnical structure design engineering	Prof. Takashi Hara○ Assistant Prof. Naoki Tatsuta	Education and research concerning geotechnical structure design engineering, such as static/dynamic interaction between ground and structure, risk management for disaster prevention, sophistication of geotechnical design and disaster prevention practices, and so on, are conducted.
Structural Design and Maintenance Engineering	Associate Prof. Tetsuya Kohno○	We focus on how to provide reliable infrastructure services. The main subjects are -Performance evaluation technology for structures -Developments of performance-based design code -Development of reinforced method based on survey on deterioration and damage

Structural Mechanics and Bridge Engineering	Associate Prof. Yasuo Suzuki○	We conduct education and research on structural mechanics and bridge engineering. In specific, with regard to steel, steel-concrete composite and fiber reinforced polymer bridge structures, the mechanical behavior of connection of members, the load carrying mechanism, the performance evaluation, the rational design and so on are studied.
Infrastructure planning	Prof. Youichi Kanayama*1 Prof. Yutaka Honda Associate Prof. Hiroto Inoi○ Associate Prof. Yuriko Takayanagi	Education and research will be conducted on the social impact assessment of securing access to outings and public transportation, methods and effectiveness evaluation of public participation in transportation planning, analysis of the impact of disasters on transportation and countermeasures, and evaluation of transportation nodes and pedestrian spaces.
Environmental Engineering for Architecture and City Planning	Prof. Yuji Hori○ Prof. Yuki Akizuki○	Education and research on "Zero Energy Buildings and Urban Energy Management for the smart city", "Environmental elements of urban architectural space for comfort, health, and safety", "Visual environment design in architecture and landscape"
Design Management	Prof. Yoshiaki Kubota○ Assistant Prof. WANG YONGCHENG	・Design excellence of public space and urban infrastructure from the perspectives of functionality and urban landscape ・Institutional capacity and governance (e.g., international comparative studies of public procurement systems) ・Revitalization of and community building in urban areas (e.g., residential living in the urban core, street audit and analysis)

Intelligent Information Processing	Prof. Yuukou Horita○	We conduct education and research on a system for estimating human emotions, preferences, and satisfaction using wearable devices, analysis of the relationship between traffic volume on roads around large-scale facilities and external factors, disaster category identification from aerial images, and forest science.
DX Design Science for Resilience	Associate Prof. Munenari Inoguchi○	We conduct teaching and research on standardized methodology for design of resilient society from the perspective of intelligence management, such as design of standardized disaster management plans and manuals for rational behavior, establishment of methodology to design DX for safe and secure society, and development of dynamic simulation for effective disaster response.
Computational Science	Associate Prof. Takayuki Haruki○	We conduct teaching and research on software systems development for civil design and engineering, the numerical analysis of biological information in pre-disease science, and particle-in-cell simulations.
Systems Engineering	Associate Prof. Tadanobu Misawa	Education and research is conducted on digital signal processing and its applications related to noise suppression, compression, visualization techniques, and brain-computer interfaces for various signals such as acoustic, image, economic, financial, cosmic ray, and biological signals.
Fluid Geophysics	Prof. Kazuaki Yasunaga	Research on the phenomena of changes in the atmosphere, oceans, land, and cryosphere that constitute the Earth's climate system and their interactions, and environmental science research on the physical properties of snow, ice, and clathrate hydrates and atmospheric particulate matter by physical methods

Geodesy	Associate Prof. Ryo Tateishi	Research on rocks and ore deposits in the world's variable zones and the tectonics that regulate them, research on magma and volcanic eruptions, research on sedimentology, stratigraphy and paleontology, research on earth history, research on earthquakes, faults, and natural disasters

(8) Advance Clean Energy

Field of Education	Academic Advisor	Research Overview
Hydrogen Isotope Science	Prof. Takayuki Abe○ Prof. Yuji Hatano○ Associate Prof. Masanori Hara○ Associate Prof. Hidehisa Hagiwara○ Lecturer Akira Taguchi Assistant Prof. Satoshi Akamaru	We conduct education and research on the physicochemical properties of hydrogen isotopes and the development of functional materials for safe and efficient utilization of hydrogen isotopes as fuels of fusion reactors and hydrogen energy systems. Our research topics are in an interdisciplinary field that covers materials science, physical chemistry, nuclear fusion engineering, and hydrogen energy engineering.
Physical Chemistry	Prof. Koichi Nozaki○ Associate Prof. Honoh Suzuki○ Lecturer Munetaka Iwamura	Photophysics and photochemistry of luminescent organic compounds or transition-metal complexes using ultrafast laser spectroscopy. Solution chemistry and thermodynamics for potential applications in medicine and optical devices.

Coordination Chemistry	Prof. Kiyoshi Tsuge○ Associate Prof. Hideki Ohtsu○	Coordination compounds, being composed of metal ions and organic/inorganic ligands, have huge diversity and potential. In this laboratory, coordination compounds with novel structures and properties are being prepared. Our interests are divided into three areas: 1. emissive coordination complexes; 2. multinuclear complexes that respond to external stimuli; and 3. functional complexes, inspired by renewable energy conversion in nature, which exhibit catalytic activity toward the reduction of CO2, O2, and N2.
Organic Chemistry	Prof. Naoto Hayashi○ Assistant Prof. Zyunro Yoshino	We synthesize numerous compounds with new, hitherto unknown properties, and then investigate the intricacies of their structures. Some of the compounds we have created include fragrant compounds and emerald crystals. The nature of such compounds and their molecular structure are intimately related. Currently, we are developing compounds that are highly responsive to heat, light, and magnetic fields.
Catalysis, Energy and Material Engineering	Prof. Noritatsu Tsubaki○	We research the development of environmentally friendly catalysis processes, the green utilization of natural resources including biomass and sunlight, the development of alternative energy instead of petroleum, and novel nanomaterials.
Computers and Applied Chemistry	Associate Prof. Tatsuya Ishiyama○	The recent rapid development of computer technology has enabled us to analyze and predict various chemical reactions and molecular dynamics based on computational chemistry. This class summarizes the basic theory of ab initio electronic structure calculations, such as molecular orbital and density functional methods.

Plasma Physics	Associate Prof. Yasuhiro Nariyuki○	Nonlinear and nonequilibrium phenomena in plasmas, and application of mathematical modeling
Materials Processing Engineering Laboratory	Prof. Toshiya Shibayanagi○	Targets of education and research in this laboratory are the key fundamental processes for industrial products, starting from the designing of materials addressing the control of phenomena in materials through elucidating their mechanisms, and optimizing their related production processes. The main subjects are 1)heat and mass transfer phenomena, 2)visualization techniques, 3)surfaces and interfaces, and 4)joining and welding.
Natural Substance Chemistry	Associate Prof. Masahiro Miyazawa Lecturer Hajime Yokoyama	Research on development of asymmetric reactions, development of new chemical reactions using transition metals, and synthesis of biologically active natural products. In particular, we conduct research on the synthesis of bioactive natural products (drug seeds) related to biological phenomena and the development of environmentally friendly catalytic reactions and synthesis methods (including material and process development) based on theoretical calculations, with a particular focus on drug discovery and chemical biology research and reaction development.
Biofunctional Chemistry	Prof. Yoshiya Ikawa Lecturer Shigeyoshi Matsumura	Elucidation of the mechanism by which nucleic acid polymeric RNAs express sophisticated biological functions, and artificial creation of novel RNA functions based on this mechanism

5. List of subjects and credits (The class subjects listed in the table are held in academic 2022)

-Common Graduate Courses for All Graduate Schools and Common Graduate Courses

Subject Classification	Subject Name	Credits	Remarks
Common Graduate Courses for All Graduate Schools	○Research Ethics	1	○denotes a required subject.
	○Science, Technology and Sustainable Society	1	
	Geographical Symbiosis Social Theory	1	
	Communication for Researchers	1	
	Art and Design Thinking	1	
	Academic writing I	1	
	Academic writing II	1	
	Advanced Data science	1	
	Career Development for Graduate Students	1	
	Intellectual Property Law	1	
Common Graduate Courses	○Laboratory Safety I	1	○denotes a required subject. ◎denotes an elective required subject.
	Laboratory Safety II	1	
	◎Introduction of Social Implementation of Natural Science（Mathematics and Informatics）	1	
	◎Introduction of Social Implementation of Natural Science（Physics and Applied Physics）	1	
	◎Introduction of Social Implementation of Natural Science（Chemistry/Applied Chemistry）	1	
	◎Introduction of Social Implementation of Natural Science（Biology/ Life Sciences and Bioengineering）	1	
	◎Introduction of Social Implementation of Natural Science（Earth, Life, Environmental Science）	1	
	◎ Introduction of Social Implementation of Natural Science（Materials）	1	
	◎Introduction of Social Implementation of Natural Science（Civil Design and Engineering）	1	
	◎ Introduction of Social Implementation of Natural Science（Clean Energy）	1	
	Logical Thinking	1	
	Science and Engineering Joint Internship I	1	
	Science and Engineering Joint Internship II	2	
	Introduction to Pharmaceutical and Medical Engineering I	1	
	Introduction to Pharmaceutical and Medical Engineering II	1	
	Practice on Pharmaceutical and Medical Engineering I	1	
	Practice on Pharmaceutical and Medical Engineering II	1	
	Science Outreach Practice I	1	
	Science Outreach Practice II	1	

(1) **Mathematics and Informatics**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	【Informatics】		○denotes a required subject.
	Advanced Data Analysis	1	
	Advanced Agent System	1	
	Advanced Visual Information Processing	1	
	Advanced Medical Ultrasonics	1	
	Advanced Neuroengineering	1	
	Advanced Communication Theory	1	
	Advanced Artificial Intelligence 1	1	
	Advanced Artificial Intelligence 2	1	
	Modern Statistical Sciences	1	
	Quantum Information Processing	1	
	Advanced Computational Biophotonics	1	
	Advanced Clinical Informatics Engineering	1	
	【Mathematics】		
	Advanced Study of Algebra A1	1	
	Advanced Study of Algebra A2	1	
	Advanced Study of Algebra B1	1	
	Advanced Study of Algebra B2	1	
	Advanced Study of Geometry A1	1	
	Advanced Study of Geometry B1	1	
	Advanced Study of Geometry A2	1	
	Advanced Study of Geometry B2	1	
	Advanced Study of Analysis A1	1	
	Advanced Study of Analysis A2	1	
	Advanced Study of Analysis B1	1	
	Advanced Study of Analysis B2	1	
	Advanced Study of Analysis C1	1	
	Advanced Study of Analysis C2	1	
	Advanced Study of Analysis D1	1	
	Advanced Study of Analysis D2	1	
	Advanced Study of Applied Mathematics A1	1	
	Advanced Study of Applied Mathematics A2	1	
	Advanced Study of Applied Mathematics B1	1	
	Advanced Study of Applied Mathematics B2	1	
	Introduction to Advanced Mathematics A1	1	
	Introduction to Advanced Mathematics A2	1	
	Introduction to Advanced Mathematics B1	1	
	Introduction to Advanced Mathematics B2	1	
	Introduction to Advanced Mathematics C1	1	
	Introduction to Advanced Mathematics C2	1	
	Introduction to Advanced Mathematics D1	1	
	Introduction to Advanced Mathematics D2	1	
	Common Core for Advanced Mathematical Informatics A1	1	
	Common Core for Advanced Mathematical Informatics A2	1	

	Common Core for Advanced Mathematical Informatics B1	1	
	Common Core for Advanced Mathematical Informatics B2	1	
	【Common Program Subjects】		
	○Seminar for Mathematics and Informatics 1	1	
	○Seminar for Mathematics and Informatics 2	1	
	○Seminar for Mathematics and Informatics 3	1	
	Different Research Field Experience in Mathematics and Informatics	1	
	○Research for Mathematics and Informatics	10	

(2) **Physics and Applied Physics**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	【Physics】		○denotes a required subject.
	Elementary Particle Physics IA	1	
	Elementary Particle Physics IB	1	
	Elementary Particle Physics IIA	1	
	Elementary Particle Physics IIB	1	
	Quantum Field Theory IA	1	
	Quantum Field Theory IB	1	
	Quantum Field Theory IIA	1	
	Quantum Field Theory IIB	1	
	Low Temperature Physics A	1	
	Low Temperature Physics B	1	
	Condensed Matter Physics A	1	
	Condensed Matter Physics B	1	
	Physics of Disordered Systems A	1	
	Physics of Disordered Systems B	1	
	Physics Using Synchrotron Radiation A	1	
	Physics Using Synchrotron Radiation B	1	
	Many-Particle Physics A	1	
	Many-Particle Physics B	1	
	Spectroscopy A	1	
	Spectroscopy B	1	
	Atomic Molecular Physics A	1	
	Atomic Molecular Physics B	1	
	Quantum Electronics A	1	
	Quantum Electronics B	1	
	Gravitational Wave Physics IA	1	
	Gravitational Wave Physics IB	1	
	Gravitational Wave Physics IIA	1	
	Gravitational Wave Physics IIB	1	
	Advanced Atmospheric Physics A	1	
	Advanced Atmospheric Physics B	1	
	Advanced Glaciology A	1	
	Advanced Glaciology B	1	

	Fluid Physics A	1	
	Fluid Physics B	1	
	Photo-Molecular Science A	1	
	Photo-Molecular Science B	1	
	【Applied Physics】		
	Advanced Microstructure Control Engineering	1	
	Advanced Solid State Engineering	1	
	Advanced Metallurgical Engineering of Iron and Steel Materials	1	
	Advanced Computational Materials Engineering	1	
	Advanced Communication Systems I	1	
	Advanced Solid State Electronics II	1	
	Advanced Electron Devices I	1	
	Advanced Electron Devices II	1	
	Advanced Engineering in Structural Materials Science	1	
	【Common Program Subjects】		
	Practical Exercise for Physics and Applied Physics	1	
	Research Internships	1	
	Techniques A for Physics and Applied Physics	4	
	Techniques B for Physics and Applied Physics	4	
	○Special Research for Physics and Applied Physics	10	

(3) **Life Science and Material Chemistry**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	【Life Sciences and Bioengineering】		○denotes a required subject.
	Advanced Lecture on Radiation bioengineering	1	
	Advanced Bioorganic Chemistry	1	
	Advanced Lecture on Brain and Neural Systems	1	
	Advanced Metabolic Engineering	1	
	Advanced Pharmacology and Genetic Engineering	1	
	Advanced Protein Systems Engineering	1	
	Advanced Bio-medical Engineering	1	
	Advanced Process Systems Engineering	1	
	Advanced Lecture on Bioinformation Engineering	1	
	Advanced Bioreaction Engineering	1	
	Advanced Biomaterials Science for Medical Engineering	1	
	Advanced Electrical Materials and Engineering on Cells	1	
	Seminar for Molecular Biology	1	
	Seminar for Bio-medical and Tissue Engineering	1	
	Seminar for Applied Microbiology	1	
	Seminar for Pharmacology	1	
	Seminar for Protein Systems Engineering 55-56	1	

	Seminar for Brain and Neural Systems Engineering	1	
	Seminar for Bioelectronics and Bioelectrical Engineering	1	
	Seminar for Bio-functional Molecular Chemistry	1	
	【Applied Chemistry】		
	Advanced Catalysis and Surface Science	1	
	Advanced Crystallography for Molecular Solid State Materials	1	
	Advanced Coordination Chemistry	1	
	Advanced Electroanalytical Chemistry	1	
	Advanced Environmental Analytical Chemistry	1	
	Advanced Colloid and Surface Chemistry	1	
	Advanced Organic Synthesis for Medicinal Chemistry	1	
	Advanced Analytical and Interfacial Chemistry	1	
	Advanced Computational Molecular Science	1	
	Advanced Biochemical Engineering	1	
	Advanced Biopolymer Material Chemistry	1	
	Advanced Catalysis Materials Chemistry	1	
	【Chemistry】		
	Photochemistry	2	
	Chemical Spectroscopy I	1	
	Chemical Spectroscopy II	1	
	Advanced Solution Chemistry I	1	
	Advanced Solution Chemistry II	1	
	Inorganic Structural Chemistry I	1	
	Inorganic Structural Chemistry II	1	
	Bioinorganic Chemistry I	1	
	Bioinorganic Chemistry II	1	
	Solid-State Organic Chemistry I	1	
	Solid-State Organic Chemistry II	1	
	Synthetic Organic Chemistry I	1	
	Synthetic Organic Chemistry II	1	
	Organometallic Chemistry I	1	
	Organometallic Chemistry II	1	
	Advanced Chemical Biology I	1	
	Advanced Chemical Biology II	1	
	Advanced Biomolecular Engineering I	1	
	Advanced Biomolecular Engineering II	1	
	Advanced Radiation and Isotope Science I	1	
	Advanced Radiation and Isotope Science II	1	
	Advanced Nanomaterial Science for Clean Energy I	1	
	Advanced Nanomaterial Science for Clean Energy II	1	
	Advanced Solid Material Science for Clean Energy I	1	
	Advanced Solid Material Science for Clean Energy II	1	
	Advanced Analytical Science for Sustainable Water Environment I	1	

	Advanced Analytical Science for Sustainable Water Environment III	1	
	Frontier Chemistry I	1	
	Frontier Chemistry II	1	
	Advanced Chemistry Laboratory	2	
	【Common Program Subjects】		
	Different Research Field Experience (Life Science and Material Chemistry)	1	
	○Research for Life Science and Material Chemistry	10	

(4) **Earth, Life, Environmental Science**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	【Earth, Life, Environmental Science】		○denotes a required subject.
	Advanced Environmental Science A	1	
	Advanced Environmental Science B	1	
	Advanced Analytical Science for Sustainable Water Environment I	1	
	Advanced Analytical Science for Sustainable Water Environment II	1	
	Advanced Analytical Science for Sustainable Water Environment III	1	
	Advanced Analytical Science for Sustainable Water Environment IV	1	
	Advanced Hydrosphere Geochemistry	1	
	Chemical Oceanography	1	
	Climate Change Analysis	1	
	Advanced Isotope Geochemistry	1	
	Advanced Environmental Microbialogy A	1	
	Advanced Environmental Microbialogy B	1	
	Advanced Plant Ecology	1	
	Advanced Plant Ecophysiology	1	
	Advanced Biochemistry	1	
	Advanced Environmental Plant Physiology	1	
	Advanced Ecology A	1	
	Advanced Ecology B	1	
	Advanced Evolutionary Biology	2	
	Advanced Microbial Ecology A	1	
	Advanced Microbial Ecology B	1	
	Advanced Stream Ecology	1	
	Advanced Ecosystem Ecology	1	
	Advanced Glaciology A	1	
	Advanced Glaciology B	1	
	Advanced Atmospheric Physics A	1	
	Advanced Atmospheric Physics B	1	
	Advanced Paleontology A	1	
	Advanced Paleontology B	1	
	Special Topics in Environmental Science I	1	

	Special Topics in Environmental Science II	1	
	Advanced Topics in Environmental Science A	1	
	Advanced Topics in Environmental Science B	1	
	Advanced Comparative Endocrinology I	1	
	Advanced Comparative Endocrinology II	1	
	Advanced Chronobiology I	1	
	Advanced Chronobiology II	1	
	Integrated Pest Management	1	
	Advanced Functional Biology of Symbiosis	1	
	Advanced Plant Resource Science I	1	
	Advanced Plant Resource Science II	1	
	Advanced Seminar on Regulation of Organisms I	1	
	Advanced Seminar on Regulation of Organisms II	1	
	Advanced Biochemistry for Signal Transmitters I	1	
	Advanced Biochemistry for Signal Transmitters II	1	
	Advanced Plant Production	1	
	Advanced Molecular Genetics	1	
	Advanced Evolutionary Genetics I	1	
	Advanced Evolutionary Genetics II	1	
	Advanced Ecological Developmental Biology I	1	
	Advanced Ecological Developmental Biology II	1	
	Advanced Animal Pathophysiology I	1	
	Advanced Animal Pathophysiology II	1	
	Advanced Experiments in Biology	1	
	Advanced Botanical Sciences I	1	
	Advanced Botanical Sciences II	1	
	Advanced Zoological Sciences I	1	
	Advanced Zoological Sciences II	1	
	Advanced Geoelectromagnetism A	1	
	Advanced Geoelectromagnetism B	1	
	Advanced Tectonophysics	1	
	Advanced Physical Properties of Earth's Materials	1	
	Advanced Physics of the Earth's Interior	1	
	Structural Geology	2	
	Evolutionary History of the Japanese Islands	1	
	Advanced Igneous Petrology	1	
	Advanced Volcanology	1	
	Advanced Geoinformatics	1	
	Advanced Resource Geology I	1	
	Advanced Resource Geology II	1	
	Paleobiology A	1	
	Paleobiology B	1	
	Earthquake Geology	1	
	Advanced Remote Sensing	1	
	Introduction to Geoglaciology	1	
	Advanced Ocean/Climate Dynamics	1	
	Advanced Applied Meteorology	1	
	Advanced Meteorology	1	
	Advanced Climate Data Analysis A	1	
	Advanced Climate Data Analysis B	1	

	Advanced Climate Informatics	1	
	Practice in Geoelectromagnetism A	1	
	Practice in Geoelectromagnetism B	1	
	Seminar for Time-series Data Analysis in Earth Science	1	
	Geological Excursion	1	
	Seminar for Geology	1	
	Laboratory and Fieldwork in Paleobiology	1	
	Field Course in Climatology	2	
	Advanced topics related to Earth System Science I	1	
	Advanced topics related to Earth System Science II	1	
	【Common Program Subjects】		
	Different Research Field Experience（Earth, Life, Environmental Science）	1	
	Seminar in Earth, Life, Environmental Science I	1	
	Seminar in Earth, Life, Environmental Science II	1	
	Seminar in Earth, Life, Environmental Science III	1	
	Seminar in Earth, Life, Environmental Science IV	1	
	○Research for Earth, Life, Environmental Science	10	

(5) **Mechatronics**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	Advanced Electric Power Engineering	1	○denotes a required subject.
	Advanced Power System Analysis	1	
	Advanced Energy Conversion I	1	
	Advanced Energy Conversion II	1	
	Advanced Control Systems Engineering I	1	
	Advanced Control Systems Engineering II	1	
	Advanced Electromagnetic Wave Communication	1	
	Advanced Communication Systems I	1	
	Advanced Communication Systems II	1	
	Advanced Bio-instrumentation Engineering	1	
	Advanced Nervous System Measurement Engineering	1	
	Advanced Measurement Systems	1	
	Advanced Solid State Electronics I	1	
	Advanced Solid State Electronics II	1	
	Advanced Electron Devices I	1	
	Advanced Electron Devices II	1	
	Advanced Engineering in Structural Materials Science	1	
	Advanced Theory of Elasticity	1	
	Advanced Theory of Plasticity	1	
	Advanced Mechanical Engineering Design	1	
	Advanced Design of Mechanical Elements	1	
	Advanced Structural Design	1	
	Advanced Precision Machining	1	

	Advanced Topics for Technology of Plasticity	1	
	Advanced Fluid Engineering	1	
	Advanced Fluid Dynamics	1	
	Advanced Mathematical and Numerical Analysis for Environment	1	
	Advanced Mechanical Intelligent Systems	1	
	Advanced Robotics	1	
	Advanced Autonomous Systems Engineering	1	
	Advanced Control Equipments	1	
	Advanced Sensing	1	
	Advanced Image Measurement	1	
	Advanced Nano Mechanical System	1	
	Different Research Field Experience (Mechatronics)	1	
	○Seminar for Mechatronics I	2	
	○Seminar for Mechatronics II	2	
	○Research for Mechatronics	10	

(6) **Materials Science and Engineering**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	Advanced Materials Forming and Engineering	1	○denotes a required subject.
	Advanced Microstructure Control Engineering	1	
	Advanced Materials Plasticity Engineering	1	
	Advanced Functional Material Design Engineering	1	
	Advanced Materials Environment and Surface Processing	1	
	Advanced Solid State Engineering	1	
	Advanced Materials Processing Engineering Laboratory I	1	
	Advanced Materials Processing Engineering Laboratory II	1	
	Advanced Metallurgical Engineering of Iron and Steel Materials	1	
	Advanced Computational Materials Engineering	1	
	Advanced Photofunctional Materials	1	
	Advanced Engineering for Reaction Design	1	
	Advanced Design of Lightweight Structural Materials	1	
	Different Research Field Experience (Materials Science and Engineering)	1	
	Global Advanced Materials Science and Engineering I	2	
	Global Advanced Materials Science and Engineering II	2	
	Global Advanced Materials Science and Engineering III	2	
	Global Advanced Materials Science and Engineering IV	2	

	Global Advanced Materials Science and Engineering V	2	
	Global Seminar of Materials Science and Engineering I	2	
	Global Seminar of Materials Science and Engineering II	2	
	○Special Seminar on Materials Science and Engineering I	2	
	○Special Seminar on Materials Science and Engineering I	2	
	○Research for Materials Science and Engineering	10	

(7) **Civil Design and Engineering**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	Advanced Information Science	1	○denotes a required subject.
	Advanced Cyber-Physical Systems	1	
	Advanced Practical Data Science for Civil Design and Engineering	1	
	Advanced Transportation Project Management	1	
	Advanced Natural Hazard and Disaster Study	1	
	Engineering Risk Management	1	
	Advanced continuum mechanics	1	
	Advanced Steel Structural Engineering	1	
	Advanced soil mechanics	1	
	Application of Geotechnical Engineering to Design Practice	1	
	Advanced Earthquake Engineering	1	
	Advanced Hydraulic Engineering I	1	
	Advanced Hydraulic Engineering II	1	
	Advanced Concrete Structure	1	
	Advanced Asset Management	1	
	Advanced City and Transportation Planning	1	
	Advanced Urban and Regional Planning	1	
	Advanced Civil Engineering Design I	1	
	Advanced Civil Engineering Design II	1	
	Advanced Social Research Design	1	
	Advanced Transport for Sustainable Society	1	
	Advanced Integrated Transportation Policy and Community Development	1	
	Advanced Information Sensing	1	
	Advanced Time Series Data Analysis	1	
	Advanced Numerical Simulation	1	
	Advanced Numerical Simulation Practice	1	
	Advanced Spatial Statistics I	1	
	Advanced Spatial Statistics II	1	
	Advanced Disaster Information Management	1	
	Advanced Urban and Architectural Environment Design I	1	

	Advanced Urban and Architectural Environment Design II	1	
	Advanced Urban and Architectural Facilities Design I	1	
	Advanced Urban and Architectural Facilities Design II	1	
	Different Research Field Experience (Civil Design and Engineering)	1	
	○Research for Civil Design and Engineering	10	

(8) **Advance Clean Energy**

Subject Classification	Subject Name	Credits	Remarks
Program Specialties	Photochemistry	2	○denotes a required subject.
	Advanced Course of Materials Process Engineering I	1	
	Advanced Radiation and Isotope Science I	1	
	Advanced Radiation and Isotope Science II	1	
	Advanced Plasma Science in Clean Energy I	1	
	Advanced Plasma Science in Clean Energy I	1	
	Internship for Advanced Clean Energy	1	
	Advanced Catalysis and Surface Science	1	
	Inorganic Structural Chemistry I	1	
	Inorganic Structural Chemistry II	1	
	Bioinorganic Chemistry I	1	
	Bioinorganic Chemistry II	1	
	Advanced Chemistry Laboratory	2	
	Advanced Computational Molecular Science	1	
	Chemical Spectroscopy I	1	
	Chemical Spectroscopy II	1	
	Different Research Field Experience （Advance Clean Energy）	1	
	Solid-State Organic Chemistry I	1	
	Solid-State Organic Chemistry II	1	
	Advanced Solid Material Science for Clean Energy I	1	
	Advanced Solid Material Science for Clean Energy II	1	
	Advanced Electronic Material Science for Clean Energy I	1	
	Advanced Electronic Material Science for Clean Energy II	1	
	○Seminar for Clean Energy I	1	
	○Seminar for Clean Energy II	1	
	Advanced Nanomaterial Science for Clean Energy I	1	
	Advanced Nanomaterial Science for Clean Energy II	1	
	Frontier Chemistry I	1	
	Frontier Chemistry Ⅱ	1	
	○Research for Clean Energy	10	