HANDBOOK

for Graduate Students in the International Program in Science and Engineering

WASEDA UNIVERSITY

2012

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Faculty of Science and Engineering
Waseda University

This handbook contains information on academic policies, curriculum, graduation requirements, and school life that applies to graduate students in the Faculty of Science and Engineering. Be careful not to lose this handbook. Even though new handbooks are issued each year, the academic policies, curriculum, and graduation requirements stated in the handbook issued in the year that you entered applies to you until you graduate.

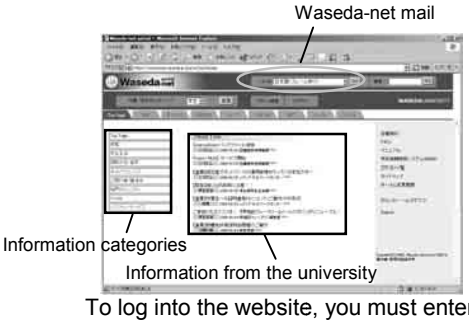
Please read through this handbook at least once and consult it whenever you have questions related to your studies at Waseda University. In addition to the information in this handbook, the University posts important announcements on the websites listed on the next page. Students should check these websites periodically.

Waseda-net portal / Waseda-net mail

This is an infrastructure system used by students, faculty and staff, and alumni of Waseda University. By logging into the system from this portal, you can get information or services tailored to your qualifications or attributes (course information such as information on course registration, examinations, and reports, or information on public events such as lecture meetings, seminars, and symposiums).

Waseda-net mail is a web mail service that you can use over a web browser from anywhere. You can also use this address after you graduate from the university.

https://www.wnp.waseda.jp



To log into the website, you must enter your Waseda-net ID and password issued to you when you entered the university.

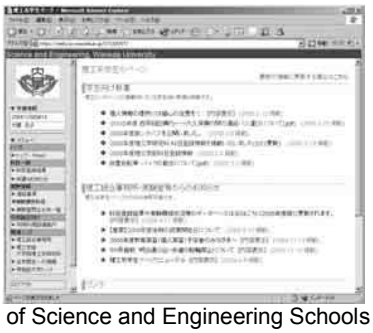
Class support portal “Course N@vi”

Course N@vi is a tool that has class support functions such as a lecture material download function and a quiz function. To use Course N@vi, log into Waseda-net portal and select “Course N@vi” from “Classes” in the left menu.

Students of Science and Engineering Schools website

This website for Students of Science and Engineering Schools was created by the Faculty of Science and Engineering for purposes such as class support. To access the page, log into Waseda-net portal and select “Students of Science and Engineering Schools website” from the left menu. You can access information tailored to individual students, such as the result of course registration and class cancellation.

You should check these pages at least once a week.



Students of Science and Engineering Schools website

Faculty of Science and Engineering website

This website provides various types of information from the Faculty of Science and Engineering. Course registration, scholarship information, and other important information are updated as needed.

http://www.sci.waseda.ac.jp/

Mobile Phone website

WW Mobile, a website accessible from mobile phones, has been set up. Messages from the Faculty of Science and Engineering, information on class cancellation or on lecture meetings, the availability of computer rooms and other information are accessible from mobile phones anytime, anywhere. An access code must be entered to check information on class cancellation. Check the access code in the Students of Science and Engineering School website.

QR code for WW Mobile,
a website accessible from mobile phones

* Check these web pages on a regular basis since the content of this handbook is subject to change.

CONTENTS

I

Features of the Faculty of Science and Engineering

Welcome to Waseda University! We are very happy that you have decided to study at Waseda University's Faculty of Science and Engineering. We look forward to working with you and hope that your graduate education here will be an exciting and rewarding experience. This handbook contains information to help you make most of your time here at Waseda. It explains the academic policies, the curriculum, and the graduation requirements for students in the International Program in Science and Engineering (IPSE) at Waseda University. In this handbook, we will refer to students in this program as "IPSE students". The International Program in Science and Engineering has academic policies, curricula, and graduation requirements distinct from other programs.

The Faculty of Science and Engineering is composed of three undergraduate schools and three graduate schools. The names of the graduate schools and the departments belonging to each of them are shown below.

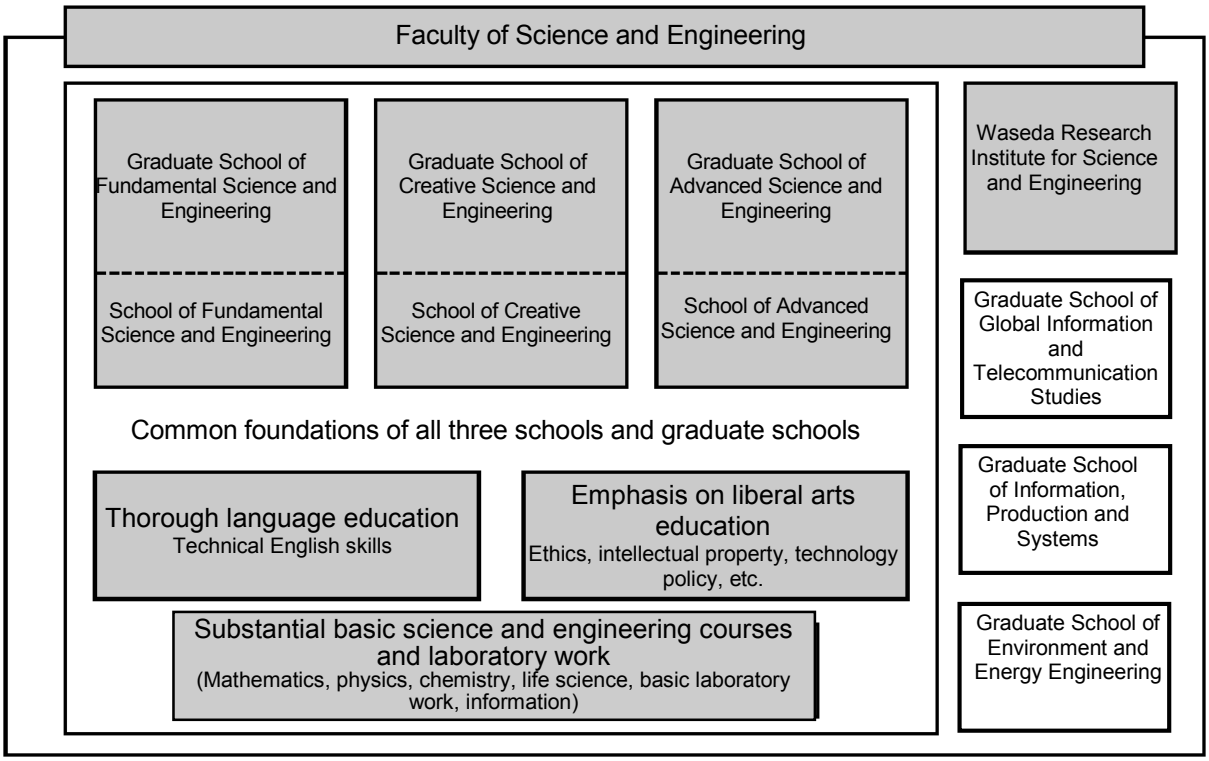
Graduate School of Fundamental Science and Engineering
Department of Pure and Applied Mathematics
Department of Computer Science and Engineering
Department of Applied Mechanics
Department of Electronic and Photonic Systems
Department of Intermedia Art and Science

Graduate School of Creative Science and Engineering
Department of Architecture
Department of Modern Mechanical Engineering
Department of Industrial Management and Systems Engineering
Department of Civil and Environmental Engineering
Department of Earth Resources and Environmental Engineering
Department of Business Design & Management

Graduate School of Advanced Science and Engineering
Department of Pure and Applied Physics
Department of Chemistry and Biochemistry
Department of Applied Chemistry
Department of Life Science and Medical Bioscience
Department of Electrical Engineering and Bioscience
Department of Integrative Bioscience and Biomedical Engineering
Department of Nanoscience and Nanoengineering
Cooperative Department of Advanced Biomedical Sciences
Cooperative Department of Advanced Health Science
Cooperative Department of Nuclear Energy

It is important to note that not all Departments accept IPSE students for graduate study. The School of Fundamental Science and Engineering runs two sub-programs, a sub-program in Pure and Applied Mathematics and sub-program in Information and Communication Technology. The former sub-program enables IPSE students to belong to the Department of Pure and Applied Mathematics. The latter sub-program enables them to belong to the Department of Computer Science and Engineering. The School of Creative Science and Engineering also runs two sub-programs, a sub-program in International Sustainable Development and another in International Environmental Disaster Prevention. The former sub-program enables IPSE students to belong to Department of Modern Mechanical Engineering. The latter sub-program enables them to belong to the Department of Civil and Environmental Engineering. Except for the three joint-departments, all Departments of the School of Advanced Science and Engineering accept IPSE students.

<Organization of the Faculty of Science and Engineering>



II

History and Profile of the Faculty of Science and Engineering

In February 1908, Shigenobu Okuma, the founder of Waseda University, keenly realizing the importance of educating scientists and engineers, established a school of science and engineering, an achievement that had been thought to be impossible for a private university. Among private universities in Japan, it remains the science and engineering educational institution with the longest history. Since the first class of 37 graduates set out into the world in 1912, many graduates have followed in their footsteps and continue to contribute actively to various areas of society.

Profile

The Graduate School of Fundamental Science and Engineering focuses on areas related to information, machines, electronics, materials, and energy, and on the foundation on which these areas rest upon: mathematics. The School consists of the Department of Pure and Applied Mathematics, the Department of Computer Science and Engineering, the Department of Applied Mechanics, the Department of Electronic and Photonic Systems, and the Department of Intermedia Art and Science. The School aims to educate individuals who have ability to think deeply and imaginatively about modern science and technology, as well as the fundamental principles on which they are based upon.

The Graduate School of Creative Science and Engineering focuses on a wide range of urgent problems that the world faces today, especially problems concerning population growth, the environment, natural resources, energy, and food. The School consists of the Department of Architecture, the Department of Modern Mechanical Engineering, the Department of Industrial Management and Systems Engineering, the Department of Civil and Environmental Engineering, the Department of Earth Resources and Environmental Engineering, and the Department of Business Design & Management. The School aims to educate scientists and engineers who can develop technologies that address the most pressing scientific and technological problems of today's world.

The Graduate School of Advanced Science and Engineering focuses on the traditional areas of science, but actively explores the implications and applications of fundamental research. The School consists of the Department of Pure and Applied Physics, the Department of Chemistry and Biochemistry, the Department of Applied Chemistry, the Department of Life Science and Medical Bioscience, the Department of Electrical Engineering and Bioscience, the Department of Integrative Bioscience and Biomedical Engineering, the Department of Nanoscience and Nanoengineering, the Joint Department of Advanced Biomedical Sciences, the Joint Department of Advanced Health Science, and the Joint Department of Nuclear Energy. The School aims to educate researchers who will work and lead at the frontiers of science and engineering.

Ⅲ

Bulletin of the International Program in the Science and Engineering

1 Guidelines on Course Selection

[Master's Program]

(1) The instructor in charge of research guidance selected at the time of admission will become your supervisor.

(2) To start working on your master's thesis, you have to earn the credits required for the first year prescribed by each department and submit a research plan for the master's thesis at the end of the first year.

(3) To receive a master's degree, you have to attend the master's program for two years or longer, earn 30 or more credits, receive required research guidance, and pass a master's thesis review. For those who are recognized by the Graduate School Steering Committee to have achieved outstanding performance, however, attendance for one year or longer shall be deemed as fulfilling the attendance period.

(4) Students must register (apply for and confirm the registration of) courses to take for that year during the specified course registration period.
When selecting courses, read this handbook, the syllabus on the web, etc. thoroughly and set your own learning goals. Be careful not to register for the wrong courses or fail to register for the courses you want to take.
Syllabus on the web https://www.wsl.waseda.jp/syllabus/JAA101.php?pLng=en
You are not allowed to attend courses that you have not registered for. You cannot earn credits if you attend courses that you have not registered for or take examinations of those courses.
You are not allowed to change or cancel courses once you have registered for them outside of the designated period. Register courses carefully in person. Be sure to confirm the results of registration.
When taking courses, be sure to confirm with your supervisor in advance and only apply for approved courses.
For actual application procedures, check the instructions on the website of the Faculty of Science and Engineering.

(5) When taking courses whose names are numbered I and II, you must take them in that order. When taking courses whose names are followed by A, B, C, and D, there is no specific order for the courses.

(6) When the number of credits earned in seminar courses exceeds the limit of credits specified by each department, the excess credits are not counted toward the number of credits required for graduation.

(7) In principle, lecture courses are to be selected from the courses provided by your department, but you may select courses in other departments in the Faculty of Science and Engineering and, with the permission of your supervisor, courses offered by other Faculties. Depending on your home department's policy, some credits earned in such courses may be counted as part of the required 30 credits for the Master's degree. Each department's policy regarding the upper limit on the number of credits that may be counted in this way is shown in the table below. Some courses, however, such as those offered by the Center for Japanese Language, Open Education Center, Media Network Center, Center for International Education, cannot be counted among the 30 credits required for the Master's degree.

Department	Non-IPSE lecture courses offered by any department in FSE (*note: Non-IPSE means existing regular programs taught mostly in Japanese*)	IPSE lecture courses offered by sub-programs other than one's home sub-programs	Courses of other graduate schools of the Faculty of Science and Engineering	Lecture courses offered by Graduate Schools belonging to Faculties other than FSE
Pure and Applied Mathematics	6	No limit	No limit	No limit
Computer Science and Engineering	6	No limit	No limit	No limit
Modern Mechanical Engineering	10	No limit	No limit	No limit
Civil and Environmental Engineering	No limit	No limit	No limit	No limit
Pure and Applied Physics	18	No limit	No limit	No limit
Chemistry and Biochemistry	18	No limit	No limit	No limit
Applied Chemistry	18	No limit	No limit	No limit
Life Science and Medical Bioscience	18	No limit	No limit	No limit
Electrical Engineering and Bioscience	18	No limit	No limit	No limit
Integrative Bioscience and Biomedical Engineering	18	No limit	No limit	No limit
Nanoscience and Nanoengineering	18	No limit	No limit	No limit

* Only limited to the courses offered by the Graduate School of Education (Mathematics Education), Faculty of Education and Integrated Arts and Sciences.

(8) If you have a special reason, you are allowed to change your department at the beginning of your second year with the approval of the relevant faculty.

(9) In preparing a master's thesis and carrying out other general research, follow the instructions of your supervisor.

(10) Students cannot attend a master's program for over four years.

(11) If it is recognized as beneficial for educational and research purposes by the supervisor, undergraduate courses of the Faculty of Science and Engineering and the Department of Science, School of Education may be taken and counted as credits required for completion (30 credits) up to the upper limit on the number of credits specified by each department. However, a student cannot take a course that he/she already took as an undergraduate student. In addition, these credits cannot be recognized as credits required for a teacher's specialized certificate and various other qualifications.

Department	Upper limit on the number of credits that can be subsequently registered
Pure and Applied Mathematics	6
Computer Science and Engineering	No limit *1
Modern Mechanical Engineering	0
Civil and Environmental Engineering	0
Pure and Applied Physics	4
Chemistry and Biochemistry	4
Applied Chemistry	6
Life Science and Medical Bioscience	10 *2
Electrical Engineering and Bioscience	12
Integrative Bioscience and Biomedical Engineering	6
Nanoscience and Nanoengineering	6

*1 These credits cannot be counted toward the credits required for completion.
*2 Includes open courses from Tokyo Women's Medical University offered by the Center for Open Education Center.

2 Degree

[Master's Program]

Department	Degree
Pure and Applied Mathematics	Master (engineering or science)
Computer Science and Engineering	Master (engineering)
Modern Mechanical Engineering	Master (engineering)
Civil and Environmental Engineering	Master (engineering)
Pure and Applied Physics	Master (engineering or science)
Chemistry and Biochemistry	Master (science)
Applied Chemistry	Master (engineering)
Life Science and Medical Bioscience	Master (engineering or science)
Electrical Engineering and Bioscience	Master (engineering or science)
Integrative Bioscience and Biomedical Engineering	Master (engineering or science)
Nanoscience and Nanoengineering	Master (engineering or science)

3 Special Research, Seminars, and Laboratory Work (4 credits)

These are seminars or laboratory classes related to specific topics planned and provided by each department as needed in response to the rapid development of science and technology. They can be selected only in the year when they are indicated as intensive lectures or intensive seminars in the relevant fields.

4 Internships and Volunteers

【Internships】

Internships provide an opportunity for students to experience how what they have studied is used in actual production sites in a related company or research institution during summer or spring holidays.

Students are graded comprehensively according to reports from companies or institutions to which they were sent, their reports or presentations, and other results. Those given a grade higher than a certain level can earn 2 credits.

The internship covers overseas training and TA (teaching assistant) programs in basic experiments in science and engineering as well.

(Note) To participate, you must submit an application for internship participation to the Office of the Center for Science and Engineering in advance. By submitting this application, accidents during your internship period are covered by the Student Disaster / Injury Insurance, in which all regular students of Waseda University are enrolled (death benefits or permanent disability indemnity).

As a rule, those who participate in this internship program are required to buy the Student Education Research Responsibility for Compensation Insurance, a program that compensates those insured for damages in case they have injured others or caused property damage.

【Volunteers】

This course requires students to submit an “activity report” and a report describing achievements for welfare activities, disaster relief activities, or other social activities related to human rights, peace, the environment, or other deep problems of human society in which they were involved for their own motives. The said two reports will be evaluated, and, if deemed passing score, the final grade will be given to you with 1 credit. Students can take this course from 1st year.

(Note) In order to take this course, students must submit in advance to the Office of the Schools of Science and Engineering a “volunteer application form” and consent letter by your guarantor. By submitting the application form to the Office, you will be insured by accident insurance for injuries you may have and by liability insurance for damage you may cause on other during your volunteer activities.

5 Tuition and Fees

(1) Payment dates

Tuition and fees must be paid by the following due dates:

Tuition and Fees	Due date for payment
Tuition and Fees for the fall semester	October 1
Tuition and Fees for the spring semester	April 16

(2) Tuition and fees for students enrolled longer than the given terms

Tuition and fees for each semester for students enrolled longer than the given term are as follows:

	Tuition	Facility fee	Laboratory fee
Students who have only yet to receive research guidance	50% of the prescribed fee	50% of the prescribed fee * No fee is charged for a doctoral program.	For a master's program, the prescribed fee for the second year of the master's program
Students who have completed research guidance although the total number of credits required for graduation has not been reached			
Students who have received research guidance and taken courses and who need to earn 14 credits or less for graduation	70% of the prescribed fee		
Students who need to receive research guidance and take courses and who need to earn 15 credits or more for graduation	Prescribed fee		

* The "number of credits to be earned for graduation" refers to the number calculated at the end of the previous semester.
* For details about tuition and fees when you are on a leave of absence or study abroad during the enrollment period, contact the Office of the Faculty of Science and Engineering.

(3) Payment method

Please pay tuition and fees using the "school expense payment form" or by account transfer through a post office or another financial institution specified in the admission procedure. The account transfer must be made from the account you specified in the admission procedure. When making payment by account transfer, be sure to check the notice of account transfer that will be sent to your school expense payer in advance. In case of any changes in the financial institution or account, inform the Center for Science and Engineering of the changes.

Tuition and fees must be paid by the specified due dates. If some special reason makes it impossible to do that, you may be allowed to postpone payment of tuition and fees. For more details, consult the Center for Science and Engineering.

(4) Removal from the school register

Those who fail to pay tuition and fees are removed from the school register which means losing student status. They are expelled with retroactive effect to the end of the semester for which they paid tuition and fees. In this case, part of the years at school and grades are cancelled. If you want to withdraw from the university for some special reason before the date when you would be automatically removed from the school register (refer to the table below), consult the Office of the Faculty of Science and Engineering.

Tuition and Fees	Due date for payment	Date of automatic removal from the school register	Date of withdrawal
Tuition and Fees for the fall semester	October 1	March 31 of the following year	September 20
Tuition and Fees for the spring semester	April 16	September 20	March 31

6 List of Courses for each Department

Department of Pure and Applied Mathematics

The objective of the Department of Pure and Applied Mathematics is to mathematically study problems arising in various fields of mathematical science, including pure and applied mathematics.

In the basic stages of this field, students must deepen their understanding of the basic concepts required for their themes. In the next stage, students need to develop their ability to apply the theories and methods they have developed to each problem. At higher stages, students carry out research activities such as exploring unknown territories in mathematical science and working on unsolved problems.

The Department of Pure and Applied Mathematics consists of the following seven research areas: Mathematical Logic, Algebra, Geometry, Analysis, Mathematics on Phenomena, Computational Mathematics, and Statistical Science. Students belong to one of the research areas from which they select courses, mainly from the recommended courses of each research area. However, these research areas are not independent from each other in terms of academic characteristics, but are organically related to each other. Therefore, students are recommended to choose and study courses in a well-balanced manner without being constrained to one specific research area.

In master's programs, aside from lecture courses, seminar courses are provided in a seminar format, and students are required to take the seminar courses provided by their supervisor. These seminars form the basis for the Department of Pure and Applied Mathematics, and students are required to be well-prepared before attending seminars. It is important for attendees to deepen their understanding of the themes through research discussions.

Students in a doctoral program are required to develop their research ability and attitude to lead research activities on their own initiative as expert researchers.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.

Summary of Each Research Area

◆ Mathematical Logic

Mathematical logic is traditionally classified into set theory, recursive function theory, model theory, and proof theory. Among these, recursive function theory is related to the fundamentals of computer sciences, and as a result, proof theory is partially related to computer-related research areas. On the other hand, set theory has developed as an area of pure mathematics, and its application to other areas of pure mathematics that deals with infinites is observed. This research area provides lectures on set theory and its application and the fundamental theory of information and computer science.

◆ Algebra

Algebra contains the following research themes: algebraic number theory, diophantine equation, automorphic function theory, commutative algebra, homological algebra, arithmetical geometry, geometric code theory, and algebraic geometry.

◆ Geometry

Geometry consists of the two pillars, “Analysis on Manifolds” and “Topology.”

The first pillar, Analysis on Manifolds, has made remarkable progress under the influence of relativity and quantum field theory, and has developed into a huge field which can be called the core of modern mathematics. The research themes in this area consist of (a) theory of analytic manifolds, (b) geometry of connections, (c) Lie group representation theory, (d) algebraic analysis of infinite degrees of freedom, and (e) nonlinear analysis on manifolds.

The other pillar, Topology, is an active area which currently shows new developments centering on the theory of three-dimensional manifolds and dynamical systems. The research themes in this area are (a) geometry of knots, (b) dynamical systems, and (c) theory of three-dimensional hyperbolic manifolds.

◆ Analysis

In the research area of Analysis, studies are conducted mainly on functional analysis, real function theory, and theory of functional equations.

In functional analysis, studies on application of the theory of function algebras to complex analysis, function spaces appearing in the probability theory, etc. are conducted. In real function theory, studies on various function spaces such as real Hardy spaces, application of interpolation theory to partial differential equations, etc. are conducted.

In the theory of functional equations, partial differential equations, especially non-linear equations, are the main topic of study, and a wide variety of problems such as nonlinear evolution equations, optimal control problems, hyperbolic equations, parabolic equations, elliptic equations, fluid equation systems, and variational problems are studied. Therefore, students in this field need to select their research theme from a wide range of options with a clear awareness of the issues. A variety of methods including orthodox differential and integral calculus, functional analysis, theory of nonlinear semigroups, variational problems, mapping degree, viscosity solutions, Fourier analysis, bifurcation theory, and computer assisted proof are used as study methods. Accordingly, even among instructors working on similar themes, the research methods and means employed may be different from each other.

◆ Mathematics on Phenomena

This research area aims to examine various phenomena which appear in natural science and engineering such as physics, chemistry, and mathematical ecology in hopes of finding new buds of mathematics from which to grow a new kind of mathematics. Specifically, mathematics of nonlinear systems (reaction-diffusion equations, nonlinear wave equations, etc.), theory of relativity, and topology of area structures of materials such as fractal structures are studied.

◆ Computational Mathematics

In the research area of Computational Mathematics, studies are conducted mainly on methods and theories (from basics to applications) which are effective for analyzing various problems of mathematics and physics with the aid of computers.

◆ Statistical Science

The present age is often called the “age of uncertainty.” The purpose of mathematical statistics is to find a fixed law hidden behind the phenomena that appear to be random at first glance and make reasonable and effective decisions by consciously using it.

In the research area of Statistical Science, the basic characteristics of probability that controls chance and composition, inference, and application of models of stochastic phenomena (stochastic processes) corresponding to various phenomena in society and nature are developed, while taking into account the basics of measure theory. Furthermore, by extracting valid information given statistical data, studies are developed on statistical model selection, estimation and validation of unknown probability distributions, and basics and applications of statistical data analysis for prediction of future matters, while clarifying the mathematical grounds. While the undergraduate school provides education focusing on introductory matters rather than rigorous theories, the graduate school provides education and research guidance to enable students to gain a systematic understanding from the basics. Study themes include financial engineering among other fields and are based on time series analysis, multivariate analysis, asymptotic theory, decision theory, Bayes estimation, modern probability theory, and statistical inference.

(I) Research guidance

Course name
Research on Mathematical Logic and Set Theory
Research on Number Theory
Research on Number Theory and Special Functions
Research on Algebraic Geometry
Research on Differential Geometry
Research on Topology
Research on Partial Differential Equations
Research on Applications of Mathematics to Materials Engineering
Research on Nonlinear Systems
Research on Numerical Analysis
Research on Statistical Mathematics
Research on Mathematical Statistics・Time Series・Finance
Research on Stochastic Processes
Research on Applied Statistics

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Advanced Number Theory	2	2	
Cyclotomic Field and Iwasawa Theory	2		2
Number Theory and Geometry	2		2
Advanced Algebra	2	2	
Advanced Geometry	2	2	
Advanced Topology	2	2	
Advanced Partial Differential Equations	2	2	
Mathematical Fluid Dynamics	2		2
Advanced Numerical Analysis	2		2
Advanced Probability and Statistics	2	2	
Mathematics of Thermodynamics and Statistical Mechanics	2	2	
Financial Econometrics	2		2
Statistical Science A	2	2	
Statistical Science B	2	2	
Statistical Science C	2	2	
Advanced Topics in Pure and Applied Mathematics A	2		2(intensive)
Advanced Topics in Pure and Applied Mathematics B	2	2(intensive)	
Advanced Topics in Pure and Applied Mathematics C	2		2(intensive)
Advanced Topics in Pure and Applied Mathematics D	2	2(intensive)	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Mathematical Logic and Set Theory A	3		3
Seminar on Mathematical Logic and Set Theory B	3	3	
Seminar on Mathematical Logic and Set Theory C	3		3
Seminar on Mathematical Logic and Set Theory D	3	3	
Seminar on Number Theory A	3		3
Seminar on Number Theory B	3	3	
Seminar on Number Theory C	3		3
Seminar on Number Theory D	3	3	
Seminar on Number Theory and Special Functions A	3		3
Seminar on Number Theory and Special Functions B	3	3	
Seminar on Number Theory and Special Functions C	3		3
Seminar on Number Theory and Special Functions D	3	3	
Seminar on Algebraic Geometry A	3		3
Seminar on Algebraic Geometry B	3	3	
Seminar on Algebraic Geometry C	3		3
Seminar on Algebraic Geometry D	3	3	
Seminar on Differential Geometry A	3		3
Seminar on Differential Geometry B	3	3	
Seminar on Differential Geometry C	3		3
Seminar on Differential Geometry D	3	3	
Seminar on Topology A	3		3
Seminar on Topology B	3	3	
Seminar on Topology C	3		3
Seminar on Topology D	3	3	
Seminar on Topology A	3		3
Seminar on Topology B	3	3	
Seminar on Topology C	3		3
Seminar on Topology D	3	3	
Seminar on Nonlinear Partial Differential Equations A	3		3
Seminar on Nonlinear Partial Differential Equations B	3	3	
Seminar on Nonlinear Partial Differential Equations C	3		3
Seminar on Nonlinear Partial Differential Equations D	3	3	
Seminar on Nonlinear Partial Differential Equations A	3		3
Seminar on Nonlinear Partial Differential Equations B	3	3	
Seminar on Nonlinear Partial Differential Equations C	3		3
Seminar on Nonlinear Partial Differential Equations D	3	3	
Seminar on Applications of Mathematics to Materials Engineering A	3		3
Seminar on Applications of Mathematics to Materials Engineering B	3	3	
Seminar on Applications of Mathematics to Materials Engineering C	3		3
Seminar on Applications of Mathematics to Materials Engineering D	3	3	
Seminar on Nonlinear Systems A	3		3
Seminar on Nonlinear Systems B	3	3	
Seminar on Nonlinear Systems C	3		3
Seminar on Nonlinear Systems D	3	3	
Seminar on Nonlinear Systems A	3		3
Seminar on Nonlinear Systems B	3	3	
Seminar on Nonlinear Systems C	3		3
Seminar on Nonlinear Systems D	3	3	
Seminar on Nonlinear Systems A	3		3
Seminar on Nonlinear Systems B	3	3	
Seminar on Nonlinear Systems C	3		3
Seminar on Nonlinear Systems D	3	3	

Department of Computer Science and Engineering

The Department of Computer Science and Engineering aims to produce students with advanced technical knowledge gained through study and education in the academic field of Information and Communications Technology (ICT) which merges information and communications technologies, positioned as a key technology to promote social activities and science and technology. The Department of Computer Science and Engineering has three key fields: information communications, information science, and information engineering.

In information communications, the development of large-scale communications and broadcasting networks comprising the infrastructure of social life and the realization of systems to respond to increasingly diverse requests from society are being strongly promoted. The academic field of information communications which serves as a basis for the establishment of communications and broadcasting networks has rapidly expanded as demanded by society and its level of study has remarkably improved. It is our primary purpose to respond to these demands. In addition, taking into consideration influences exerted by ICT on social life, we also have the objective of clarifying the orientation of the research field backed by information communications ethics.

In information science, knowledge information processing, software engineering, computer architecture, etc. are the driving forces for the development and use of computers. These technologies are entering into times of qualitative innovation in addition to quantitative expansion of the fields of application. In other words, we are facing fundamental problems which cannot be solved simply by an increase in the speed and capacity of hardware and the sophistication of software technologies. For example, the development of the new field of study called “knowledge processing,” as represented by artificial intelligence, is expected. However, in order to develop this field of research, studies on information processing based on new ideas and theories that go beyond the conventional framework of computer science have become indispensable.

Information engineering is a field that provides education and research in technological fields of information science and information communications, and it mainly deals with basic studies on the systematization of theories and their application to engineering. In addition to our objective of promoting advanced studies, we aim to develop human resources who put emphasis on manufacturing with broad and deep knowledge, and doing so requires intensive efforts toward research and education on theories and applications by expert groups.

As mentioned above, information communications, information science, and information engineering have advanced rapidly, and without cooperation between these closely related fields, it is extremely difficult to maintain the environment for advanced research and education. Furthermore, it has been recognized that circulative development in which a result in a field serves as a basis for development in another field is indispensable. This Department has five research areas: Human-Computer Interaction, Networking, Advanced Computing Mechanisms, Advanced Software, and Information Systems Architecture, and aims to integrate and fuse information communications, information science, and information engineering through organic links among these areas.

Graduates of the doctoral program are expected to play an active role in educational institutions including universities, as well as electronic manufacturers, research centers of telecommunications carriers, etc., and state-run research institutes. Graduates of the master’s program are, in addition to the above research institutes, also expected to engage in the

development of new software at software development companies, etc. and play an active role in a variety of fields including consulting firms.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.
4. To start writing a master's thesis, students must have earned credits from Seminar A and B, completed 12 or more credits from lecture courses, and submitted a research plan for their master's thesis at the end of the first year.

Summary of Each Research Area

◆ Human-Computer Interaction

In this research area, research and education are focused on the application of information processing systems centering on computers to the fields of hardware, software, and ICT.

Specifically, the content of the research guidance is as follows:

1. Multimedia/hypermedia systems
   To make computers easier to use and more familiar to people, computers using multiple media such as images, characters, and sounds are being studied. At present, studies are being conducted on Computer Aided Instruction (CAI), Computer Aided Learning (CAL), and database systems in this multimedia/hypermedia environment.

2. Perceptual information processing
   To realize a more human-friendly computer, it is important to develop a system which enables sharing of an experience space with people by installing a perceptual information processing mechanism on a computer. In order to develop such a system, this research area conducts studies on speech recognition and comprehension, image comprehension, etc.

3. Computer application
   Computers are currently used in all industries and there are countless applications in the ICT field. As representative themes in this study, VLSI CAD (Computer Aided Design), power system analysis, identification and recognition of character strings with an image in the background, discrete system simulation, aerohydrodynamic analysis, finite element method, robots, etc. can be listed.

◆ Networking

Research and education on information network systems, media systems, etc. are conducted to respond to the societal demands for research and education in line with the rapid progress in information and communications technology. In addition, being in the age of the fusion of communications, broadcasting, and computers, and based on the fact that the establishment of fundamental technologies of advanced information processing and efficient information

transmission is essential, research and education are mainly focused on image information and radio communication.

Specifically, the content of the research guidance is as follows:

1. Information network systems
   Along with the studies on structures and functions of nodes and links, multimedia information processing and encoding, system architectures including network security and personal communications, and protocols, we conduct studies on network control methods and terminal functions of broadband digital integrated networks with the fusion of communication and broadcasting in mind.

2. Media system
   Studies are conducted on theories of image and speech information processing, encoding, recognition, etc. and their application to systems for the purpose of application to human interfaces, and mobile multimedia systems.

3. Image information
   Research guidance is provided to help students fully understand elemental technologies including generation, transformation, processing, encoding, transmission, storage, display, and recording of images, and to allow them to choose the latest themes they are interested in from among the above topics. In addition to the above knowledge, by integrating knowledge on information network technologies and image databases, research guidance is provided on methods for constructing multimedia communications systems.

4. Wireless communications (radio communications)
   Studies are conducted on fundamental technologies such as radio wave propagation, network architecture, and digital transmission for wireless communications such as cellular phone services, wireless LANs, and digital broadcasting. All of the studies on these wireless communications are for the ultimate purpose of the efficient use of radio frequency bands. As specific examples of study items, solutions and measures for signal degradation by fading and radio wave interference, network architecture technologies including line allocation methods based on a multiple access scheme, transmission technologies on highly efficient modulation/demodulation and error correction based on digital signal processing, etc. can be listed.

◆ Advanced Computing Mechanisms

The role of computers is to amplify the intellectual ability of people. Thus far, computers have mainly helped people by performing routine operations at a high speed. However, with the rapid increase in the amount of information created and distributed in society, computers are required to perform more advanced and intellectual operations to ease the burden on people. From this point of view, in the field of Advanced Computing Mechanisms, research is being conducted from a variety of angles on methods to drastically enhance the functions of computers, aiming to discover and present what the information processing environment should be like in the future.

Specifically, the content of the research guidance is as follows:

1. Knowledge information processing
   The framework to express, acquire, and manipulate advanced information beginning with knowledge is studied as a basis for knowledge information processing. Research on the

theoretical foundations of the programming languages used to describe them, programming techniques, and execution methods is also performed. On the practical side, studies on various applications such as architecture, design, diagnosis, and control of large-scale knowledge processing systems are conducted. Furthermore, to create an advanced information processing environment, it is extremely important to examine not only information processing within a computer but the exchanges of information between multiple entities (people or computers), in other words, communication, from a software point of view. On a fundamental level, studies are conducted in this research on theoretical formulations, security problems, etc. of communication between multiple entities.

2. Learning information processing system
   Learning here means that computers develop more advanced information processing by accumulating knowledge. Such learning is feasible when an information processing system is ill-posed and uncertain, which leads to flexible information processing observed in living organisms which have senses. Specifically, learning algorithms, neuron computing (connectionism), and advanced computer-human interface techniques resulting from their application can be listed.

◆ Advanced Software

In the current information society, the need for software to control computers has become enormous and production has not been able to keep up with the demand for a long time. The purpose of this research area is to conduct research and education on theoretical and practical methods to produce highly reliable and sophisticated software in response to the demands of society.

Specifically, the content of the research guidance is as follows:

1. Theory of program design
   This is a field which has achieved results that are theoretically the most beautiful and practically the most useful in computer science. In modern society where computers have spread into every corner of human life, programs which are essential to control computers have increasingly grown in importance. From a practical point of view, research and education are carried out on the design and analysis theories for the programs based on a sequential, parallel, deterministic, or probabilistic algorithm.

2. Software development engineering
   To efficiently develop and maintain good software, various methodologies and a group of software tools to support it are essential. For the purpose of realizing these things, research themes are focused on design and implementation of software with a variety of new concepts and establishment of their theoretical basis. Studies are also conducted on the development of hardware architectures, support for their designs, and various systems to implement such software.

3. Distributed cooperative software
   Opportunities for multiple programs on the Internet, software to control equipment, etc. work in tandem with each other have increased. Such software autonomously determines its actions while cooperating, adjusting, and competing with other software, aiming to realize functions and services that are difficult to achieve alone. Education and research are carried out on the theoretical foundation of this technology, elemental technologies of multi-agent systems to realize cooperative intellectual actions, and network systems and society simulations utilizing them.

4. Reliable software engineering
   Studies are conducted on software engineering technologies and knowledge systems which are essential to efficiently develop and maintain various kinds of highly functional and high-quality software. Specifically, we deal with highly efficient development technologies such as modeling, design, reuse, and auto-generation to fill the gap between requirements and programs, and high-quality development technologies such as review, test, measurement, and formal verification. We try to establish practically useful methodologies and tools backed by theory and experience and develop empirically derived knowledge. Furthermore, security problems, incorporation, processes, management, etc. can be listed as studies on applications.

◆ Information Systems Architecture

In this research area, we conduct a wide range of studies, from basics to applications, on information processing covering networks and their nodes which are computers, hardware, and software. In the field of information processing technologies develop very rapidly, so that even if research results are temporarily achieved, they soon become obsolete. A feature of this research area, however, is that it aims to discover leading-edge themes without being constrained to the existing framework of research.

Specifically, the content of the research guidance is as follows:

1. Information architecture design and analysis
   Studies are conducted from a theoretical and practical point of view regarding design methodologies and CAD (computer-aided design) methods for a wide range of systems covering computers, entire information communication network systems, and VLSIs (very-large-scale integrated circuits) which are indispensable system components. From a theoretical perspective, basic fields of study such as algorithms and data structures, computer programming techniques, computational complexity theory, computational geometry, graph theory, and combination theory are covered. From a practical perspective, design (architecture, functional synthesis, logical synthesis, layout, and test) and analysis (modeling, simulation, operation verification, reliability, operation speed, and power consumption) of large-scale networks, print circuits, packaging, multi-tip modules, LSIs for image and communication processing, general and special-purpose processors, analog functional elements, etc. are covered.

2. Parallel processing hardware/software
   Studies are conducted on the architecture, software (automatic parallelizing compiler, parallel OS, scheduling, etc.), and application of parallel processing technology, which is today's basic architectural technology for all computers—from microprocessors to supercomputers.

3. Infrastructure software and advanced application
   Studies are conducted on infrastructure software such as operating systems, distributed middleware, and network software, and advanced applications realized by using them. Infrastructure software studies include those on resource management and abstraction, infrastructure software development methods, security, large-scale information management, high reliability, real-time processing, etc. Studies on advanced applications include those on advanced multi-media applications including image analysis and phonetic analysis, very large-scale data management applications such as web search, ubiquitous computing applications that integrate real world and cyber spaces, etc.

(I) Research guidance

Course name
Research on Perceptual Computing
Research on Image Information
Research on Wireless Communications
Research on Information Networks
Research on Wireless Signal Processing
Research on Quantum Imaging
Research on Parallel Information Processing
Research on Computational Intelligence
Research on Software Development Engineering
Research on Software Environment
Research on Intelligent Software
Research on Reliable Software Engineering
Research on Information Structure
Research on Distributed Systems
Research on Advanced Computing Systems
Research on Parallel and Distributed Architecture
Research on Design and Analysis Systems
Research on Advanced Processor Architecture
Research on Information System Design
Research on Multi Media System
Research on Computer Vision and Pattern Analysis

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Perceptual Computing	2		2
Advanced Image Information	2		2
Wireless Communications Network	2	2	
Advanced Information Networks	2		2
Digital Imaging	2	2	
Reliable Software	2		2
Information Integration of Symbols and Patterns	2		2
Theory of Computer Software	2	2	
Advanced Parallel Processing	2		2
Distributed Embedded and Real-Time Processing	2		2
Advanced Computer Architecture	2		2
Network Applications	2	2	
Advanced Processor Architecture	2		2
Digital System Design	2	2(second half)	
Wireless Signal Processing	2		2
Advanced Intelligent Software	2	2	
Software Quality Assurance	2		2
Computer Vision and Pattern Analysis	2		2
Sound and perception	2		2
Advanced Parallel Processing	2		2

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Perceptual Computing A	3		3
Seminar on Perceptual Computing B	3	3	
Seminar on Perceptual Computing C	3		3
Seminar on Perceptual Computing D	3	3	
Seminar on Image Information A	3		3
Seminar on Image Information B	3	3	
Seminar on Image Information C	3		3
Seminar on Image Information D	3	3	
Seminar on Wireless Communications A	3		3
Seminar on Wireless Communications B	3	3	
Seminar on Wireless Communications C	3		3
Seminar on Wireless Communications D	3	3	
Seminar on Information Networks A	3		3
Seminar on Information Networks B	3	3	
Seminar on Information Networks C	3		3
Seminar on Information Networks D	3	3	
Seminar on Quantum Imaging A	3		3
Seminar on Quantum Imaging B	3	3	
Seminar on Quantum Imaging C	3		3
Seminar on Quantum Imaging D	3	3	
Seminar on Parallel Information Processing A	3		3
Seminar on Parallel Information Processing B	3	3	
Seminar on Parallel Information Processing C	3		3
Seminar on Parallel Information Processing D	3	3	
Seminar on Computational Intelligence A	3		3
Seminar on Computational Intelligence B	3	3	
Seminar on Computational Intelligence C	3		3
Seminar on Computational Intelligence D	3	3	
Seminar on Software Environment A	3		3
Seminar on Software Environment B	3	3	
Seminar on Software Environment C	3		3
Seminar on Software Environment D	3	3	
Seminar on Software Development Engineering A	3		3
Seminar on Software Development Engineering B	3	3	
Seminar on Software Development Engineering C	3		3
Seminar on Software Development Engineering D	3	3	
Seminar on Information Structure A	3		3
Seminar on Information Structure B	3	3	
Seminar on Information Structure C	3		3
Seminar on Information Structure D	3	3	

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Distributed Systems A	3		3
Seminar on Distributed Systems B	3	3	
Seminar on Distributed Systems C	3		3
Seminar on Distributed Systems D	3	3	
Seminar on Advanced Computing Systems A	3		3
Seminar on Advanced Computing Systems B	3	3	
Seminar on Advanced Computing Systems C	3		3
Seminar on Advanced Computing Systems D	3	3	
Seminar on Parallel and Distributed Architecture A	3		3
Seminar on Parallel and Distributed Architecture B	3	3	
Seminar on Parallel and Distributed Architecture C	3		3
Seminar on Parallel and Distributed Architecture D	3	3	
Seminar on Design and Analysis Systems A	3		3
Seminar on Design and Analysis Systems B	3	3	
Seminar on Design and Analysis Systems C	3		3
Seminar on Design and Analysis Systems D	3	3	
Seminar on Advanced Processor Architecture A	3		3
Seminar on Advanced Processor Architecture B	3	3	
Seminar on Advanced Processor Architecture C	3		3
Seminar on Advanced Processor Architecture D	3	3	
Seminar on Information System Design A	3		3
Seminar on Information System Design B	3	3	
Seminar on Information System Design C	3		3
Seminar on Information System Design D	3	3	
Seminar on Wireless Signal Processing A	3		3
Seminar on Wireless Signal Processing B	3	3	
Seminar on Wireless Signal Processing C	3		3
Seminar on Wireless Signal Processing D	3	3	
Seminar on Intelligent Software A	3		3
Seminar on Intelligent Software B	3	3	
Seminar on Intelligent Software C	3		3
Seminar on Intelligent Software D	3	3	
Seminar on Multimedia Systems A	3		3
Seminar on Multimedia Systems B	3	3	
Seminar on Multimedia Systems C	3		3
Seminar on Multimedia Systems D	3	3	
Seminar on Reliable Software Engineering A	3		3
Seminar on Reliable Software Engineering B	3	3	
Seminar on Reliable Software Engineering C	3		3
Seminar on Reliable Software Engineering D	3	3	
Seminar on Computer Vision and Pattern Analysis A	3		3
Seminar on Computer Vision and Pattern Analysis B	3	3	
Seminar on Computer Vision and Pattern Analysis C	3		3
Seminar on Computer Vision and Pattern Analysis D	3	3	

Department of Modern Mechanical Engineering

The Department of Modern Mechanical Engineering aims to develop distinctive social practices from a new point of view while working to integrate and restructure the mechanical engineering system, and also aims to develop a new path for mechanical engineering to take by mastering the essence of engineering that contributes to society by making use of scientific investigations and knowledge.

In education and research, by building an education and research system which allocates heuristic science focusing on the future and realization-oriented engineering which contributes to society as soon as practicably possible in a well-balanced manner to allow students to participate in a series of processes consisting of research, development, experiment, demonstration, and practical application, we develop human resources with sufficient ability to investigate and utilize knowledge while keeping a hands-on approach. Through such education and research activities, we develop high-level professionals with specialized knowledge and expertise and workers and researchers who can contribute to society.

This Department conducts research in three main areas: Advanced Design and Co-creation Division, Robotics and Medical/Welfare Service Division, and Environment and Energy Division. Related Departments include the Department of Integrative Bioscience and Biomedical Engineering of the Graduate School of Advanced Science and Engineering and the Graduate School of Environment and Energy Engineering as an independent graduate school.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.
4. To start writing a master's thesis, students must have earned credits from Seminar A and B, completed 12 or more credits from lecture courses, and submitted a research plan for their master's thesis at the end of the first year.

Summary of Each Research Area

◆ Advanced Design and Co-creation Division

There is a human act called design that is the core of mechanical engineering based on technology. In this research area, we develop education and studies in line with the places of life (behaviors) of diverse people with different values and backgrounds. In other words, based on the basic education and studies of mechanical design making full use of computers, we develop a new academic field to aim for the development of coexistence (co-creation) technologies and design technologies in the places where humans live. To be specific, we aim to develop various machinery designs with this new perspective, designs of aerospace structures which will rapidly develop in the future, designs of communication systems, and communication designs in a broad sense as well.

◆ Robotics and Medical/Welfare Service Division

Health has become a top concern for people in developed countries facing a super-aging society, including Japan. In this research area, we perform research and development of systems that guarantee a high quality of life by exploring advanced bio-mechatronics technologies including human support robots, welfare equipment, operation support systems, and artificial organs through interdisciplinary approaches including not only engineering, but also medical science, physiology, and psychology. Specifically, we proceed with the development of humanoid robots and systems such as a rehabilitation support system, a minimally-invasive operation support system, and artificial hearts, and the solution of human movement, control, and cognitive characteristics, human bio-functions, etc. which serve as their basis.

◆ Environment and Energy Division

In the design, research, and development of various machines and equipment, there is an increasing requirement to use resources and energies effectively, taking into consideration the conservation of the global environment and human living environments. This is the reason why the 21st century is called the “Century of the Environment.” In this research area, by particularly focusing on basic phenomena relating to thermal energy and its conversion and the mechanical equipment to which they are applied, we aim to develop advanced engineers and researchers who deal with engineering problems related to the environment and energy through education and studies. In particular, taking into account the expansion of the scope of studies of the energy field, we cooperate with independent graduate schools, the Project Research Institute, the Environmental Research Institute, and other graduate schools related to the environment that position not only the Okubo Campus, but also the Honjo Waseda Area as their social experiment stations. We develop human resources who can make full use of scientific and engineering methods by providing students with opportunities to learn how to clarify and solve challenging problems by participating in these projects.

(I) Research guidance

Course name
Research on Design of Mechanical Systems
Research on Design Optimization
Research on Intelligent Machines
Research on Neuro Robotics
Research on Environment and New Energy
Research on Thermal Energy Conversion Engineering

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Advanced Topics in Project Management	2		2
Advanced Topics in Resources Processing and Recycling	2	2	
Advanced Topics in Earth and Environmental Science	2		2(intensive)
Advanced Topics in E-business, Technology, and Legal Affairs	2	2	
Advanced Topics in Architectural Design and Engineering A	2		2
Advanced Topics in Architectural Design and Engineering B	2	2	
Advanced Topics in Environmental Design	2	2	
Advanced Topics in Robots and Systems	2		2
Advanced Topics in Environmental Management	2		2
Advanced Topics in Environment and Energy Conversion Engineering	2	2	
Advanced Topics in New Energy	2	2	
Advanced Topics in Environmental Impact Assessment	2		2
Advanced Topics in Environmental Science	2		2
Advanced Topics in Computational Fluid Dynamics with Chemical Reactions	2		2
Analysis and discussion of papers on advanced robotics	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Structural Design A	3		3
Seminar on Structural Design B	3	3	
Seminar on Structural Design C	3		3
Seminar on Structural Design D	3	3	
Seminar on Structural Dynamics A	3		3
Seminar on Structural Dynamics B	3	3	
Seminar on Structural Dynamics C	3		3
Seminar on Structural Dynamics D	3	3	
Seminar on Intelligent Biomechatronic Systems A	3		3
Seminar on Intelligent Biomechatronic Systems B	3	3	
Seminar on Intelligent Biomechatronic Systems C	3		3
Seminar on Intelligent Biomechatronic Systems D	3	3	
Seminar on Neuro Robotics A	3		3
Seminar on Neuro Robotics B	3	3	
Seminar on Neuro Robotics C	3		3
Seminar on Neuro Robotics D	3	3	
Seminar on Environment and Advanced New Energy A	3		3
Seminar on Environment and Advanced New Energy B	3	3	
Advanced Seminar on Environment and Energy Engineering A*	3		3
Advanced Seminar on Environment and Energy Engineering B*	3	3	
Seminar on Thermal Energy and Chemical Kinetics Engineering A	3		3
Seminar on Thermal Energy and Chemical Kinetics Engineering B	3	3	

* To be taken in the 2nd year of the Master's program.

Department of Civil and Environmental Engineering

Civil and Environmental Engineering is an academic field with a mission to establish facilities to serve as a basis for human life directly or indirectly and maintain and improve them. Since engineers in this field are required to have a high-level and wide range of engineering judgment in particular, harmonization of advanced technologies and humanity is expected. In this Department, education and studies are conducted aiming to develop appropriate human resources for that purpose. This department can be roughly divided into the research areas of Infrastructure Engineering, Environment and Disaster Prevention, and Planning and Management. As one of the characteristics of the Department of Civil and Environmental Engineering, each research area has content quite different from the others. Therefore, students need to consider their desire and aptitude well, and carefully decide which research area and which study to select.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.
4. To start writing a master's thesis, students must have earned credits from Seminar A and B, completed 12 or more credits from lecture courses, and submitted a research plan for their master's thesis at the end of the first year.

Summary of Each Research Area

◆ Infrastructure Engineering

In Infrastructure Engineering, we perform theoretical and experimental studies on problems related to various structures covered by the Department of Civil and Environmental Engineering.

In Structural Design, studies are conducted on problems related to designs and constructions of various civil engineering structures such as aboveground structures, underground structures, and marine structures.

In Structural Mechanics, studies are conducted on problems such as nonlinearity, buckling, load bearing capacity, shock and elasto-plasticity of mechanical behaviors of structures, dynamics of composite structures and composite materials, etc. In Concrete Engineering, studies regarding concrete structures are conducted on mechanical behaviors and design methods of concrete members, basic physical properties, durabilities of concrete, etc.

Since the above research areas are related to each other, we sometimes proceed with our studies in cooperation with other areas.

◆ Environment and Disaster Prevention

Environment and Disaster Prevention conducts theoretical and experimental studies on problems related to the environment and disaster prevention in the hydrosphere and geosphere.

In Coastal Engineering, studies are conducted on hydraulics and coastal engineering, in particular, the numerical analysis, field surveys and hydraulic experiments of tsunami and storm surges, wave mechanics, sediment transport and beach erosion, water quality, etc. In Water and Environmental Engineering, studies are conducted on the restoration of water environments with resource recycling processes, advanced water and wastewater treatment processes, conservation of water environments using bio-barriers, simulation of water quality, etc. In River Engineering, based on river hydraulics and hydrology, we perform numerical analysis and experimental studies on multinatural river creation making use of the mechanism of natural river migration and problems related to environment and disaster prevention of drainage basins.

In Soil and Foundation Engineering and Soil Mechanics, the static and dynamic characterization of soil and studies on modeling for analysis of the ground and foundation structure under various conditions are carried out. Research and development on soil liquefaction phenomena that occur during an earthquake, damage to structures arising from liquefaction, and countermeasures against soil liquefaction, especially focusing on sandy ground are performed. In addition to the basic studies on a soil constitutive equation representing the stress-strain relationship, experimental and analytical studies on behavior and security of the ground in underground construction work such as earthwork and filling and environmental problems of the ground are carried out.

◆ Planning and Management

In various changes in the social and economic environment surrounding the urban areas in recent years, the role of studies on city planning has become increasingly important.

The field of city planning is extremely wide. However, in this research area, our study includes multiple courses concerning planning design technologies covering everything from investigation, analysis, planning, design, to management and operation, centering on (1) arrangement of urban and regional areas, space design, and urban development, (2) urban transportation and urban infrastructure facilities, (3) urban disaster prevention, and (4) landscape planning and design. The areas are not limited to Japan and overseas city planning is also positioned as an important course of study. Our study approaches are based not only on theoretical and methodological basic studies, but also on active and practical application studies including policy experiments on real urban areas.

(I) Research guidance

Course name
Research on City and Regional Planning
Research on Landscape and Aesthetics of infrastructure
Research on Concrete Structure
Research on Structural Mechanics
Research on Structural Design
Research on Structural Design
Research on Soil Mechanics
Research on Coastal Engineering and Management
Research on River Engineering
Research on Water and Environmental Engineering

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Advanced Coastal Engineering	2		2
Advanced River Engineering	2	2	
Advanced Soil Mechanics A	2		2
Advanced Soil Mechanics B	2	2	
Advanced Structures and Materials	2	2	
Advanced Topics in Water and Environmental Engineering	2	2	
Advanced Topics in Civil Engineering A	2	2(intensive)	
Advanced Topics in Civil Engineering B	2		2(intensive)
Advanced Topics in Civil Engineering C	1	2(intensive)	
Advanced Topics in Civil Engineering D	1		2(intensive)
Coastal Disaster Prevention	2	2	
Coastal Environment	2		2
Infrastructure Management	2	2	
Steel Material and Structure	2	2	
Urban Studies and Planning A	2		2
Advanced Topics in Project Management	2		2
Advanced Topics in Resources Processing and Recycling	2	2	
Advanced Topics in Earth and Environmental Science	2		2(intensive)
Advanced Topics in E-business, Technology, and Legal Affairs	2	2	
Advanced Topics in Architectural Design and Engineering A	2		2
Advanced Topics in Architectural Design and Engineering B	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on City and Regional Planning A	3		3
Seminar on City and Regional Planning B	3	3	
Seminar on City and Regional Planning C	3		3
Seminar on City and Regional Planning D	3	3	
Seminar on Landscape and Aesthetics of Infrastructure A	3		3
Seminar on Landscape and Aesthetics of Infrastructure B	3	3	
Seminar on Landscape and Aesthetics of Infrastructure C	3		3
Seminar on Landscape and Aesthetics of Infrastructure D	3	3	
Seminar on Structural Mechanics A	3		3
Seminar on Structural Mechanics B	3	3	
Seminar on Structural Mechanics C	3		3
Seminar on Structural Mechanics D	3	3	
Seminar on Structural Design 1A	3		3
Seminar on Structural Design 1B	3	3	
Seminar on Structural Design 1C	3		3
Seminar on Structural Design 1D	3	3	
Seminar on Structural Design 2A	3		3
Seminar on Structural Design 2B	3	3	
Seminar on Structural Design 2C	3		3
Seminar on Structural Design 2D	3	3	
Seminar on Soil Mechanics A	3		3
Seminar on Soil Mechanics B	3	3	
Seminar on Soil Mechanics C	3		3
Seminar on Soil Mechanics D	3	3	
Seminar on Coastal Engineering and Management A	3		3
Seminar on Coastal Engineering and Management B	3	3	
Seminar on Coastal Engineering and Management C	3		3
Seminar on Coastal Engineering and Management D	3	3	
Seminar on River Engineering A	3		3
Seminar on River Engineering B	3	3	
Seminar on River Engineering C	3		3
Seminar on River Engineering D	3	3	
Seminar on Water Quality Engineering A	3		3
Seminar on Water Quality Engineering B	3	3	
Seminar on Water Quality Engineering C	3		3
Seminar on Water Quality Engineering D	3	3	
Seminar on Concrete Structure A	3		3
Seminar on Concrete Structure B	3	3	
Seminar on Concrete Structure C	3		3
Seminar on Concrete Structure D	3	3	

Department of Pure and Applied Physics

Research on important issues of modern physics and their technological applications is conducted in the Department of Pure and Applied Physics. There are a broad range of research fields such as mathematical physics, elementary particle physics, nuclear physics, cosmic-ray physics, astrophysics, nuclear engineering, condensed matter physics, polymer physics, biophysics, applied crystallography, optics, measurement engineering, control engineering, and information engineering. Interdisciplinary research is also being conducted. It is assumed that students taking this degree acquired academic knowledge equivalent to that of graduates of the Department of Physics or the Department of Applied Physics of undergraduate programs.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree. In addition, you should consult "Core Courses / Recommended Courses" of this handbook.

[Note]
1. Students cannot obtain credits from combined undergraduate school lectures if they have already earned them in undergraduate schools.

Summary of Each Research Area

◆ Mathematical Physics

Research is conducted on mathematical problems that occur in physics, engineering, biology, etc. mainly by using methods of analysis, geometry, etc. In particular, the basic knowledge of functional analysis, the theory of evolution equation, the theory of nonlinear partial differential equation, the theory of real function and the variational method is important and basic knowledge of physics is also necessary. There are a variety of nonlinear phenomena to be studied. As far as the nonlinear partial differential equations are concerned, there are parabolic equations (Navier-Stokes equation, nonlinear heat equation), hyperbolic equations (nonlinear Klein-Gordon equation, compressible fluid equation), dispersion equations (KdV equation, nonlinear Schroedinger equation), a nonlinear elliptic equation which describes the steady state of the above-mentioned equations, and mixed equations as complex simultaneous equations of the above-mentioned equations (Zakharov equation, Davey-Stewartson equation), etc. The typical research themes of these equations are the existence, nonexistence, uniqueness, multiplicity, regularity, analyticity, specificity, symmetry, periodicity, almost periodicity, asymptotic behavior, stability, etc. of solutions.

◆ Theoretical Nuclear and Particle Physics

In this research area, theoretical studies on nuclei and elementary particles in a broad sense are conducted. In the former, the main course is the theoretical study of nuclear structure and the results are applied to astrophysics, etc. In the study of nuclear structure, emphasis is

placed on the study of infinitely-large hypothetical nuclei using the quantum-mechanical many-body problem techniques. In relation to the above, the studies of the internal structure of neutron stars, etc. are also conducted. In the latter, theoretical research on elementary particle physics is conducted. In relation to this course, phenomenological analyses of the standard model of elementary particles and models beyond the standard model, theoretical studies on unified models of elementary particles including gravity and supersymmetry are incorporated. Studies on quantum mechanics in mesoscopic systems, quantization of stochastic processes and various problems related to the basic theories and measurement problems of quantum mechanics, etc. are also conducted.

◆ Particle and Applied Radiation Physics

In this research area, various studies related to physics, material science and measurement using accelerators, etc. are conducted.

There are three areas in this research field, High Quality Beam Science, High Energy Experimental Particle Physics, and Applied Radiation Physics, and studies are conducted by using experimental techniques.

High Quality Beam Science

The application of beams from accelerators to the production of radial tires for automobiles, heat resistance wires, etc. is a technology which is already widely used in the industrial world. It is also indispensable for the development of particle physics, measurement, medical treatment, semiconductor industry, radiation physics, and radiation chemistry. Against this backdrop, studies are conducted on accelerators themselves and their general applications to material science such as advanced development of accelerators, improvement in the quality of beams, and advanced applications of beams.

High Energy Experimental Particle Physics

Centering on international joint research through overseas large-scale accelerator experiments (mainly Tevatron/CDF experiments at the Fermi National Accelerator Laboratory in the United States and LHC/ATLAS experiments at the European Organization for Nuclear Research in Switzerland), studies on particle reactions, features of the internal structure, etc. are advanced by experimental studies on particle collision at the high energy frontier. These experiments, based on the theory of elementary particles, are intended to deepen understanding of nature by bringing new elements to the theory and finding new phenomena through the design of experiments and comparison of the results with the theory.

The principles of a modern collider-type accelerator and detector, data acquisition methods, and analytical techniques are discussed in detail. Modern elementary particle physics experiments require a wide range of abilities from understanding of theories to detection, correct knowledge of the measurement principle, and computer technologies to analyze by taking advantage of statistics. This research area covers all of them in detail. In LHC experiments, in particular, studies on elementary particle physics at an unprecedented energy scale are advanced and a new door is expected to open. In addition to a substantial understanding of the theory of elementary particles, it is desirable to have an attitude to actively conduct studies with overseas researchers.

Applied Radiation Physics

Development of a radiation detector for detecting high-energy gamma beams from visible light and various particles and experimental and observational studies are conducted using the

detector. The most advanced physical measurement is widely needed on the sites related to elementary particles, the universe, and medical treatment, and it is a universal technology transcending the boundaries of fields. In this study, studies on applications to satellite and balloon experiments, accelerator beam experiments, and the next generation medical devices, etc. are conducted through joint research with Stanford University and the Space Science Laboratory.

◆ Astrophysics

This research area aims to understand various phenomena in the universe from the point of view of physics from the two approaches of theories and experimental observations. In Theoretical Astrophysics and Cosmology, studies on relativistic astrophysics, particle astrophysics, and high-energy astrophysics are conducted. We mainly work on cosmological themes (origin and evolution of the universe, phase transition of the universe, inflationary cosmology, and cosmological structure formation issues) and high-energy astrophysical themes (supernovas, black holes, physics of neutron stars, and neutrinos and gravitational wave phenomena related to them) by using both analytical techniques and numerical approaches. Recently, studies on gravitational theories from the viewpoint of astrophysics such as dark energy studies are also conducted.

In Experimental Astrophysics, experimental studies are conducted on solid planetary science, space physics, and high-energy astrophysics and cosmology. Using measuring instruments equipped with artificial satellites and balloons, studies on the (1) formation and evolution of the moon, planets, and small astral bodies by the observation of the MeV field γ beam, (2) clarification of high-energy phenomena arising in astral bodies and space by the observation of high-energy γ beam and corpuscular beam, and (3) search for cosmic dark matter are mainly conducted. In addition, research and development on a new detector required for their observation and experiment fields and peripheral technologies and studies on elementary particle reactions in relation to high-energy cosmic phenomena using accelerator beams are also conducted.

In Radio Astronomy and Astrophysics, we constructed a 64-element radio interferometer (http://www.phys.waseda.ac.jp/astro/) and the biggest interferometer in Japan consisting of eight 20-meter spherical mirrors and one 30-meter spherical mirror in the Nasu Pulsar Observatory and are monitoring the universe which rapidly changes in terms of radio waves every day (http://www.waseda.jp/student/weekly/tokusyu/saizensen/sai898.html). A radio transient object which shone for one day was detected during the observation for the past one to two years for the first time in the world in the direction away from the galactic plane and we are now trying to identify the object. We are investigating whether or not it is a radio burst from an astral body at a cosmological distance like a gamma-ray burst and what can be observed using other corresponding wavelengths. We are also developing a signal-processing device for quasar and pulsar observation and deeply study the relation between these astral bodies and new astral bodies from the time domain.

◆ Theory of Condensed Matter Physics

Condensed matter physics is the field of physics that consistently solves the structures of materials and their behaviors from the microscopic scale such as molecules, atoms, and nuclei to the macroscopic scale. In particular, the theory of condensed matter physics discovers and solves typical micro, macro, and meso-scale phenomena and advances development of a new universal theory based on them. In order to do so, it is necessary to deeply understand physical phenomena in general and master quantum mechanics, statistical mechanics, and mathematical-physical techniques which have made dramatic progress in recent years. Furthermore, the studies that have been advanced by large-scale computer simulations have gradually made it possible to predict a new property emerged from existing materials and unknown principles. From the aspect of learning, our goal is to learn a wide range of theoretical methods to understand general principles in the physical world, transcending individual courses of study.

The specific themes of members in this research area are as follows:

(1) Experimental and theoretical studies on pattern formations observed in physical, chemical, and biological systems such as the collective motion of many-particle systems and viscoelastic material deformation
(2) Studies on problems of chaos, the ergodic mechanism, nonlinear, and nonequilibrium statistical physics and theoretical biological physics
(3) Theoretical studies on low temperature many-body phenomena of superconductivity, superfluidity, charge density waves, etc. and the tunnel effect.
(4) Studies on the chaotic system mechanism, nonequilibrium statistical mechanics of the chaotic and infinite quantum systems, and other nonequilibrium-related problems

◆ Condensed Matter Physics

In this research area, studies on condensed matter physics which supports core technologies in modern industry are conducted from various perspectives. One feature of this research area is that it prepares a variety of lecture courses related to the studies. Among these courses, in particular, solid state physics (lattice vibration, electrons in periodic fields, optical property and dielectric function, magnetism, superconductivity, and surface/interface) and crystal physics (basics of crystallography and property measurement means such as X-ray, electron ray, neutron scattering, an electron microscope, STM, and nonlinear laser spectroscopy) are the basics of the crystal system physics. Therefore, students are required to fully acquire knowledge about them.

The study themes of members in this research area are as follows:

(1) Vacuum technology as the basic technology of surface physics, electron spectroscopy, electron beam diffraction, tunneling spectroscopy, and solution of elementary excitation phenomena (phonon, plasmon) on solid surfaces using these techniques. Discovery of new phenomena in an extremely high vacuum environment and basic study for creating a super coherent electron beam. Physical properties of carbon-based and BN-based ultra-thin film with new functions.
(2) Development of new functions caused by strong electron correlations and discovery of new properties. At present, particular emphasis is placed on thermoelectric conversion effect caused by electron correlations and nonlinear conduction of the charge order system.

(3) Development of materials by combining charge and spin degrees of freedom and study of physical properties using optical measurement, etc. For example, charge ordering, geometric frustration, magnetic field control of the induction rate, etc.

(4) Study of abnormal phenomena appearing in the electron system with strong electron correlations using a low temperature scanning tunneling microscope (STM). For example, solution of high-temperature superconductivity and charge order or physical phenomena such as associated substantial inhomogeneity. Direct observation of quantum phenomena appeared in low temperature or in nano region and discovery of new phenomena.

(5) Studies of a new function which is not the sum of each film and creation of a film with an enormous function (holistic substance) are conducted by creating oxide superlattice films controlled at the atomic level. Nondestructive observations of the three-dimensional fault structure of the polarization reversal structure are made using the nonlinear optical microscope developed by this *kenkyushitsu* (faculty lab).

(6) Physical experiments of soft matters centering on liquid crystal. Clarification and control of the interactions between molecules connecting molecules comprising the system and macro static and dynamic properties. Application to liquid crystal nano-machines and simulated biological membranes.

(7) Investigation of the features of structural phase transition in alloys and oxides using diffraction crystallography techniques and theoretical examination of the physical origins of structural phase transition and its related properties based on basic studies such as lattice vibration, solid state electronic theory, statistical mechanics, etc.

◆ Biophysics

Life phenomena are now being solved based on the properties of polymers and their aggregates. Contemporary biology has been developing as a study based on physics and chemistry, transcending the conventional framework. There are a wide variety of courses to be studied from micro levels (the nano level is the main course of study these days), including genomic DNAs and proteins, to macro levels, including biomolecular machines consisting of protein aggregates, cells, and biological tissues as their aggregates. There are also a variety of study methods as well. To be precise, while we clarify by experiments various biological motions (muscular contraction, cell movements, cell divisions, etc.), various biofunctions and life phenomena including information transfer between (in) cells and bioenergy transformation based on substances involved in them and their properties, we are trying to theoretically solve the structure formation dynamics of proteins and the mechanisms of biofunctions (including molecule levels). Contemporary biology has infinite frontiers to explore. It is a study attractive to any kind of brain, not only to those who like biology, but also to those who like physics, chemistry or mathematics. Regarding this research area, also refer to the part of the Department of Integrated Bioscience and Biomedical Engineering.

◆ Physics-Based Engineering: Informatics, Photonics and Image Science

This research area consists of the optical field and the measurement control engineering field. The optoelectronic industry made remarkable progress in recent years, and along with the progress of laser, microfabrication, optical materials, and computers, the optical application field has been expanding from image formation and measurement to communication, electronics, medicine, biology, and information processing, and new application methods have also been actively developed. Furthermore, new applications and the pursuit of extremes have promoted new theoretical development and the formation of a framework of basic optics.

Against this backdrop, studies of basic physical phenomena and new application methods related to light are conducted in the optical field regarding quantum optics, statistical optics, coherence theory, Fourier optics, optical information processing, optical measurement, optical design, optical communication, optical computers, laser engineering, optoelectronics, micro optics, nonlinear optics, image science, X-ray optics, medical optics, physiological optics, eye optics, etc. while at the same time reviewing the system of completed classical optics.

Measurement and control have been the main topics of engineering so far. However, the progress of computers has brought a new concept of information to this field and promoted new development by merging measurement control engineering with electronic engineering, system engineering, communication engineering, information engineering, etc. In the field of measurement control engineering, research guidance on the following five studies are provided to develop researchers and engineers who can bear the leading edge of the times and that have a sense for engineering based on a knowledge of physics and mathematics: the "study of information transformation engineering handling photonic integrated circuits and communication, measurement, and processing of multimedia information using them," the "study of semiconductor device engineering to study a physical solution of an ultrafast phenomenon of semiconductors using ultrashort optical pulse laser and its application to devices," the "study of system control engineering handling the discrete event system and modeling, analysis, control problems, etc. of the hybrid system," the "study of information engineering handling robotics, neural networks, image processing, acoustic signal processing, etc.," and the "study of image information processing handling multimedia information based on generation, processing, and modeling of three-dimensional moving images."

Core Courses / Recommended Courses

When core courses and recommended courses are provided by each research area of your department, take courses in accordance with the specified method.

Mathematical Physics

Core courses

Earn 2 or more credits from the following core courses:

Mathematical Physics A

There are no recommended courses.

Theoretical Nuclear and Particle Physics

Core courses

Taking the following core courses is recommended. Taking your supervisor's courses is required.

Advanced Quantum Mechanics A
Advanced Quantum Mechanics B
Advanced Elementary Particle Physics A
Advanced Elementary Particle Physics B
Nuclear Physics A
Nuclear Physics B
Nuclear Astrophysics

There are no recommended courses.

Astrophysics

Core courses

Earn 6 or more credits from the following core courses:

Advanced Cosmology
Elementary Processes in Astrophysical Phenomena A
Elementary Processes in Astrophysical Phenomena B
Cosmic Radiation Physics A
Cosmic Radiation Physics B
High Energy Astrophysics A
High Energy Astrophysics B

Recommended courses

It is recommended that you take about 8 credits from the following recommended courses:

Advanced Quantum Mechanics A
Advanced Quantum Mechanics B
Advanced Elementary Particle Physics A
Advanced Elementary Particle Physics B
Nuclear Physics A
Nuclear Physics B
Nuclear Astrophysics
Experimental High Energy Particle Physics A
Experimental High Energy Particle Physics B
Experimental High Energy Particle Physics C
Experimental High Energy Particle Physics D
Advanced Statistical Mechanics
Advanced Statistical Physics
Quantum Physics of Matter A
Quantum Physics of Matter B
Physics of Non-equilibrium Systems
Advanced Topics in Nonlinear Phenomena

Theory of Condensed Matter Physics

Core courses

Earn 2 or more courses from the following core courses:

Advanced Statistical Mechanics
Advanced Topics in Nonlinear Phenomena
Quantum Physics of Matter A
Quantum Physics of Matter B
Advanced Statistical Physics
Mathematical Aspects of Statistical Mechanics
Physics of Non-equilibrium Systems
Soft Condensed matter
Advanced Theoretical Quantum Physics A
Advanced Theoretical Quantum Physics B

There are no recommended courses.

Condensed Matter Physics

Core courses

Earn 4 or more courses from the following core courses:

Advanced Condensed Matter Physics A
Advanced Condensed Matter Physics B
Advanced Condensed Matter Physics C
Advanced Condensed Matter Physics D
Surface Physics
Semiconductor Quantum Physics
Advanced Solid State Physics
Soft Condensed matter
Advanced Statistical Mechanics
Advanced Statistical Physics
Quantum Physics of Matter A
Quantum Physics of Matter B
Physics of Non-equilibrium Systems
Advanced Theoretical Quantum Physics A
Advanced Theoretical Quantum Physics B

There are no recommended courses.

Particle and Applied Radiation Physics

Core courses

Earn 4 or more credits from the following core courses. Taking your supervisor’s courses is required.

Particle Accelerator Applications
Cosmic Radiation Physics A
Cosmic Radiation Physics B
High Energy Astrophysics A
High Energy Astrophysics B
Advanced Condensed Matter Physics C
Experimental High Energy Particle Physics A
Experimental High Energy Particle Physics B
Experimental High Energy Particle Physics C
Experimental High Energy Particle Physics D

There are no recommended courses.

Physics-Based Engineering: Informatics, Photonics and Image Science

Core courses

Earn 6 or more credits from the following core courses:

Advanced Applied Optics
Advanced Quantum Optics
Measurement and Information Technology
Integrated and Guided Optics
Semiconductor Quantum Physics
Image Processing

There are no recommended courses.

Biophysics

There are no core courses.

Recommended courses

Advanced Biophysics A
Advanced Biophysics B
Advanced Molecular Biology
Cell Biology
Molecular Physiology
Advanced Statistical Mechanics
Advanced Statistical Physics
Mathematical Aspects of Statistical Mechanics
Physics of Non-equilibrium Systems
Advanced Topics in Nonlinear Phenomena
Advanced Condensed Matter Physics C
Soft Condensed matter
Advanced Applied Optics

(I) Research guidance

Course name
Research on Mathematical Physics
Research on Mathematical Physics
Research on Theoretical Particle Physics
Research on Theoretical Nuclear Physics
Research on Theoretical Foundations of Quantum Mechanics
Research on Theoretical Astrophysics and Cosmology
Research on Theoretical Astrophysics
Research on Radio Astronomy
Research on Observational Astrophysics
Research on Observational Astrophysics
Research on Statistical Physics
Research on Theoretical Low Temperature Physics
Research on Physics of Nonequilibrium Systems
Research on Experimental Surface Physics
Research on Quantum Physics of Complex Systems
Research on Soft Matter Physics
Research on Experimental Low Temperature Condensed Matter Physics
Research on Experimental Biophysics
Research on Molecular Biophysics
Research on Theoretical Biophysics
Research on Beam Applications
Research on Optical Science and Engineering
Research on Semiconductor Devices
Research on Photonic Devices
Research on Measurement and Information Technology
Research on Image Processing
Research on Applied Radiation Physics
Research on Experimental Particle Physics
Research on Theoretical Quantum Physics
Research on Pie-electron materials
Research on Quantum and Laser Physics
Research on Quantum Optics

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Mathematical Physics A	2		2
Advanced Quantum Mechanics A	2		2
Advanced Quantum Mechanics B	2	2	
Advanced Elementary Particle Physics A	2		2
Advanced Elementary Particle Physics B	2	2	
Nuclear Physics A	2		2
Nuclear Physics B	2	2	
Nuclear Astrophysics	2		2
General Relativity and Gravitation	2		2
Advanced Cosmology	2		2
Elementary processes in astrophysical phenomena A	2	2	
Elementary processes in astrophysical phenomena B	2	2	
Experimental High Energy Particle Physics A	2	2	
Experimental High Energy Particle Physics B	2	2	
Experimental High Energy Particle Physics C	2		2
Experimental High Energy Particle Physics D	2	2(intensive)	
Cosmic Radiation Physics A	2		2
Cosmic Radiation Physics B	2	2	
High Energy Astrophysics A	2		2
High Energy Astrophysics B	2	2	
Advanced Statistical Mechanics	2	2	
Advanced Statistical Physics	2	2(intensive)	
Advanced Topics in Nonlinear Phenomena	2	2(intensive)	
Quantum Physics of Matter A	2		2
Quantum Physics of Matter B	2		2
Mathematical Aspects of Statistical Mechanics	2		2
Physics of Non-equilibrium Systems	2	2	
Advanced Condensed Matter Physics A	2	2	
Advanced Condensed Matter Physics B	2		2
Advanced Condensed Matter Physics C	2	2	
Advanced Condensed Matter Physics D	2		2
Mathematical Aspects of Statistical Mechanics	2		2
Surface Physics	2		2
Advanced Solid State Physics	2		2
Soft Condensed matter	2		2
Advanced Biophysics A	2		2
Advanced Biophysics B	2	2	
Molecular Reproductive Biology	2		2
Cell Biology	2		2
Molecular Physiology	2		2
Particle Accelerator Applications	2	2	
Advanced Applied Optics	4	2	
Measurement and Information Technology	2		
Integrated and Guided Optics	2		2
Semiconductor Quantum Physics	2	2	
Image Processing	2		2(intensive)
Advanced Biophysics A	2		2
Advanced Quantum Optics	2	2	
Advanced Theoretical Quantum Physics A	2		2
Advanced Theoretical Quantum Physics B	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Functional Equations and Applications A	3		3
Seminar on Functional Equations and Applications B	3	3	
Seminar on Functional Equations and Applications C	3		3
Seminar on Functional Equations and Applications D	3	3	
Seminar on Mathematical Physics A	3		3
Seminar on Mathematical Physics B	3	3	
Seminar on Mathematical Physics C	3		3
Seminar on Mathematical Physics D	3	3	
Seminar on Theoretical Particle Physics A	3		3
Seminar on Theoretical Particle Physics B	3	3	
Seminar on Theoretical Particle Physics C	3		3
Seminar on Theoretical Particle Physics D	3	3	
Seminar on Theoretical Nuclear Physics A	3		3
Seminar on Theoretical Nuclear Physics B	3	3	
Seminar on Theoretical Nuclear Physics C	3		3
Seminar on Theoretical Nuclear Physics D	3	3	
Seminar on Theoretical Foundations of Quantum Mechanics A	3		3
Seminar on Theoretical Foundations of Quantum Mechanics B	3	3	
Seminar on Theoretical Foundations of Quantum Mechanics C	3		3
Seminar on Theoretical Foundations of Quantum Mechanics D	3	3	
Seminar on Theoretical Astrophysics and Cosmology A	3		3
Seminar on Theoretical Astrophysics and Cosmology B	3	3	
Seminar on Theoretical Astrophysics and Cosmology C	3		3
Seminar on Theoretical Astrophysics and Cosmology D	3	3	
Seminar on High Energy Astrophysics A	3		3
Seminar on High Energy Astrophysics B	3	3	
Seminar on Gravitational Physics A	3		3
Seminar on Gravitational Physics B	3	3	
Seminar on Astrophysics A	3		3
Seminar on Astrophysics B	3	3	
Seminar on Radio Astronomy A	3		3
Seminar on Radio Astronomy B	3	3	
Seminar on Cosmic Radiation Physics A	3		3
Seminar on Cosmic Radiation Physics B	3	3	
Seminar on Observational Astrophysics A	3		3
Seminar on Observational Astrophysics B	3	3	
Seminar on Observational Astrophysics C	3		3
Seminar on Observational Astrophysics D	3	3	
Seminar on Cosmic Radiation Physics C	3		3
Seminar on Cosmic Radiation Physics D	3	3	
Seminar on Statistical Physics A	3		3
Seminar on Statistical Physics B	3	3	
Seminar on Nonlinear Nonequilibrium Physics A	3		3
Seminar on Nonlinear Nonequilibrium Physics B	3	3	
Seminar on Low Temperature Physics A	3		3
Seminar on Low Temperature Physics B	3	3	
Seminar on Low Temperature Physics C	3		3
Seminar on Low Temperature Physics D	3	3	
Seminar on Mathematics of Pattern Formation A	3		3
Seminar on Mathematics of Pattern Formation B	3	3	
Seminar on Physics of Pattern Formation A	3		3
Seminar on Physics of Pattern Formation B	3	3	
Seminar on Surface Physics A	3		3
Seminar on Surface Physics B	3	3	

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Surface Physics C	3		3
Seminar on Surface Physics D	3	3	
Seminar on Quantum Physics of Complex Systems A	3		3
Seminar on Quantum Physics of Complex Systems B	3	3	
Seminar on Quantum Physics of Complex Systems C	3		3
Seminar on Quantum Physics of Complex Systems D	3	3	
Seminar on Soft Matter Physics A	3		3
Seminar on Soft Matter Physics B	3	3	
Seminar on Soft Matter Physics C	3		3
Seminar on Soft Matter Physics D	3	3	
Seminar on Experimental Low Temperature Condensed Matter Physics A	3		3
Seminar on Experimental Low Temperature Condensed Matter Physics B	3	3	
Seminar on Experimental Low Temperature Condensed Matter Physics C	3		3
Seminar on Experimental Low Temperature Condensed Matter Physics D	3	3	
Seminar on Experimental Biophysics A	3		3
Seminar on Experimental Biophysics B	3	3	
Seminar on Experimental Biophysics C	3		3
Seminar on Experimental Biophysics D	3	3	
Seminar on Molecular Biophysics A	3		3
Seminar on Molecular Biophysics B	3	3	
Seminar on Molecular Biophysics C	3		3
Seminar on Molecular Biophysics D	3	3	
Seminar on Theoretical Biophysics A	3		3
Seminar on Theoretical Biophysics B	3	3	
Seminar on Simulations in Biophysics A	3		3
Seminar on Simulations in Biophysics B	3	3	
Seminar on Accelerator Applications A	3		3
Seminar on Accelerator Applications B	3	3	
Seminar on Accelerator Applications C	3		3
Seminar on Accelerator Applications D	3	3	
Seminar on Information Optics A	3		3
Seminar on Information Optics B	3	3	
Seminar on Optical Engineering A	3		3
Seminar on Optical Engineering B	3	3	
Seminar on Semiconductor Devices A	3		3
Seminar on Semiconductor Devices B	3	3	
Seminar on Semiconductor Devices C	3		3
Seminar on Semiconductor Devices D	3	3	
Seminar on Photonic Devices A	3		3
Seminar on Photonic Devices B	3	3	
Seminar on Photonic Devices C	3		3
Seminar on Photonic Devices D	3	3	
Seminar on Measurement and Information Technology A	3		3
Seminar on Measurement and Information Technology B	3	3	
Seminar on Measurement and Information Technology C	3		3
Seminar on Measurement and Information Technology D	3	3	
Seminar on Image Processing A	3		3
Seminar on Applied Radiation Physics A	3		3
Seminar on Applied Radiation Physics B	3	3	
Seminar on Applied Radiation Physics C	3		3
Seminar on Applied Radiation Physics D	3	3	
Seminar on Experimental Particle Physics A	3		3
Seminar on Experimental Particle Physics B	3	3	
Seminar on Experimental Particle Physics C	3		3

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Experimental Particle Physics D	3	3	
Seminar on Theoretical Quantum Physics A	3		3
Seminar on Theoretical Quantum Physics B	3	3	
Seminar on Theoretical Quantum Physics C	3		3
Seminar on Theoretical Quantum Physics D	3	3	
Seminar on Pie-electron materials A	3		3
Seminar on Pie-electron materials B	3	3	
Seminar on Pie-electron materials C	3		3
Seminar on Pie-electron materials D	3	3	
Seminar on Atomic, Molecular and Optical Physics A	3		3
Seminar on Atomic, Molecular and Optical Physics B	3	3	
Seminar on Atomic, Molecular and Optical Physics C	3		3
Seminar on Atomic, Molecular and Optical Physics D	3	3	
Seminar on Quantum Optics A	3		3
Seminar on Quantum Optics B	3	3	
Seminar on Quantum Optics C	3		3
Seminar on Quantum Optics D	3	3	

Department of Chemistry and Biochemistry

In the Department of Chemistry and Biochemistry, we aim to develop human resources with flexible thinking and creativity backed by a basic ability in chemistry through explaining reactions and properties of materials from the perspective of atoms and molecules, development of a quantum chemical calculation method and various spectroscopies required for the explanation, development of new organic compounds and metal complex synthesis methods, analysis of the reaction mechanism, synthesis of compounds with useful functions and reactions, life science based on chemistry, etc.

The Department of Chemistry and Biochemistry has the four research areas of physical chemistry, organic chemistry, inorganic and analytical chemistry, and biochemistry.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree. Students should take the core courses without fail and some of the recommended courses.

Summary of Each Research Area

◆ Physical Chemistry

In this research area, studies and education on the structure of molecules and molecular assembly, electronic state, vibrational state, properties, and chemical reaction mechanisms are conducted. Using experimental methods such as infrared/Raman spectroscopy, ultraviolet/visible/near-infrared absorption spectroscopy, emission spectroscopy, and nonlinear spectroscopy, as well as a scanning probe microscope, the electronic state and vibrational state of molecules and solids are observed. Electrical and optical properties are also measured. In addition, physical properties of molecules are theoretically predicted by quantum chemical calculations using the molecular orbital method, the density functional theory, etc. We also aim to solve the chemical reaction mechanism by using the molecular dynamics method. The materials to be studied are organic and inorganic materials, electroconductive polymers, biological polymers, functional materials, etc. Based on these study results, we aim to discover new phenomena and properties, construct basic theories, and develop high-performance organic electronic devices (light-emitting diode, transistor, solar battery).

◆ Organic Chemistry

In this research area, studies and education on organic synthetic chemistry, functional organic chemistry, and reaction organic chemistry are conducted.

We aim to understand organic chemical reactions and the structure and characteristics of organic compounds and do research on new reactions, studies of synthesis and properties of new compounds, creation of functional substances, etc. mainly from the standpoint of pure chemistry. In organic synthetic chemistry, the main topics are the total synthesis of bioactive

natural products and studies of new reactions and new synthesis methodologies directed at total synthesis, the study of the catalytic asymmetric synthesis method, and the study of bioorganic chemistry based on total synthesis. In functional organic chemistry, the main topics are the study of synthesis and reactions of new functionalized molecules with structural properties, the development of organic molecular catalysis, and the design and reaction system construction of analogs of biomolecules. In reaction organic chemistry, the main topics are creating new and efficient carbon-carbon bond formation reactions by taking advantage of the characteristics of organometallic complexes and the development of catalytic asymmetric reactions, among other things.

◆ Inorganic and Analytical Chemistry

In this research area, studies and education on inorganic reaction mechanisms and coordination chemistry are conducted. Through studying kinetics and equilibrium of inorganic reactions in solution such as ligand substitution reactions and oxidation-reduction reactions, we aim to solve the mechanisms of the reactions. Studies of the synthesis, structure and properties of metal complexes with metal-metal bonds, nano-scale metal complexes, and functional complexes are also conducted. In particular, the focus is placed on studies of electrochemical and photochemical properties.

In performing the studies, we use various spectroscopic methods such as X-ray crystal structure analysis, ESR, NMR, high pressure NMR, stopped-flow spectrophotometry, and high-pressure stopped-flow spectrophotometry, cyclic voltammetry, spectroelectrochemistry etc..

◆ Biochemistry

In this research area, life science is studied from the viewpoint of chemistry by taking a life form as an assembly of chemical substances and life phenomena as chemical reactions. Studies are conducted on life phenomena by applying marine natural compounds as bioprobes in Chemical Biology, collagen in Biomolecular Chemistry, solution of the mechanism of cell division and its control in Molecular Biology, and medical engineering ethics in Medical Bio-science & Bio-engineering.

Core Courses / Recommended Courses

When core courses and recommended courses are provided by each research area of your department, take courses in accordance with the specified method.

It is preferable to take core courses without fail. It is also preferable to take some courses from the recommended courses.

Organic Chemistry

Core courses	Recommended courses
Advanced Functional Organic Chemistry	Advanced Structural Chemistry
Advanced Synthetic Chemistry	Advanced Photo Physical Chemistry
	Advanced Inorganic Reaction Chemistry
	Advanced Coordination Chemistry

Physical Chemistry

Core courses	Recommended courses
Advanced Electronic State Theory	Advanced Condensed Matter Physics C
Advanced Structural Chemistry	
Advanced Photo Physical Chemistry	

Inorganic and Analytical Chemistry

Core courses	
Advanced Inorganic Reaction Chemistry	There are no recommended courses.
Advanced Coordination Chemistry	

Biochemistry

Core courses	
Advanced Chemical Biology	There are no recommended courses.
Advanced Biomolecular Chemistry	
Advanced Molecular Biology	

(I) Research guidance

Course name
Research on Structural Chemistry
Research on Electronic State Theory
Research on Chemical Synthesis Methods
Research on Functional Organic Chemistry
Research on Reaction Organic Chemistry
Research on Inorganic Reaction Chemistry
Research on Coordination Chemistry
Research on Biomolecular Chemistry
Research on Chemical Biology
Research on Molecular Biology
Research on Photo Physical Chemistry

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Advanced Structural Chemistry	2		2
Advanced Electronic State Theory	2	2	
Advanced Synthetic Chemistry	2	2	
Advanced Functional Organic Chemistry	2	2	
Advanced Reaction Organic Chemistry	2		2
Advanced Inorganic Reaction Chemistry	2	2	
Advanced Coordination Chemistry	2	2	
Chemical Toxicology	2		2
Advanced Biomolecular Chemistry	2	2	
Advanced Chemical Biology	2		2
Advanced Molecular Biology	2		2
Advanced Photo Physical Chemistry	2		2
Experiments in Chemistry and Biochemistry	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Structural Chemistry A	3		3
Seminar on Structural Chemistry B	3	3	
Seminar on Structural Chemistry C	3		3
Seminar on Structural Chemistry D	3	3	
Seminar on Electronic State Theory A	3		3
Seminar on Electronic State Theory B	3	3	
Seminar on Electronic State Theory C	3		3
Seminar on Electronic State Theory D	3	3	
Seminar on Chemical Synthesis Methods A	3		3
Seminar on Chemical Synthesis Methods B	3	3	
Seminar on Chemical Synthesis Methods C	3		3
Seminar on Chemical Synthesis Methods D	3	3	
Seminar on Functional Organic Chemistry A	3		3
Seminar on Functional Organic Chemistry B	3	3	
Seminar on Functional Organic Chemistry C	3		3
Seminar on Functional Organic Chemistry D	3	3	
Seminar on Reaction Organic Chemistry A	3		3
Seminar on Reaction Organic Chemistry B	3	3	
Seminar on Reaction Organic Chemistry C	3		3
Seminar on Reaction Organic Chemistry D	3	3	
Seminar on Inorganic Reaction Chemistry A	3		3
Seminar on Inorganic Reaction Chemistry B	3	3	
Seminar on Inorganic Reaction Chemistry C	3		3
Seminar on Inorganic Reaction Chemistry D	3	3	
Seminar on Coordination Chemistry A	3		3
Seminar on Coordination Chemistry B	3	3	
Seminar on Coordination Chemistry C	3		3
Seminar on Coordination Chemistry D	3	3	
Seminar on Biomolecular Chemistry A	3		3
Seminar on Biomolecular Chemistry B	3	3	
Seminar on Biomolecular Chemistry C	3		3
Seminar on Biomolecular Chemistry D	3	3	
Seminar on Chemical Biology A	3		3
Seminar on Chemical Biology B	3	3	
Seminar on Chemical Biology C	3		3
Seminar on Chemical Biology D	3	3	
Seminar on Molecular Biology A	3		3
Seminar on Molecular Biology B	3	3	
Seminar on Molecular Biology C	3		3
Seminar on Molecular Biology D	3	3	
Seminar on Photo Physical Chemistry A	3		3
Seminar on Photo Physical Chemistry B	3	3	
Seminar on Photo Physical Chemistry C	3		3
Seminar on Photo Physical Chemistry D	3	3	

Department of Applied Chemistry

In the Department of Applied Chemistry, we aim for "practical applications of theories" as our foundational spirit by developing practical chemistry to realize environment-friendly energy and material transformation while integrating interdisciplinary fields based on chemistry. In the master's program, based on the broad, practical basics cultivated by education programs in schools, and through education and studies in research and development of the advanced chemical field in response to deepened and refined specialized fields, we develop human resources with research abilities (planning, implementation, evaluation) putting emphasis on practical sciences and engineering. Students develop the abilities they need to work on their study courses actively in preparing their master's thesis and develop broad knowledge and practical skills by taking courses which strengthen their basic scholastic ability, courses and seminar courses which deal with profound fields of study, and courses which enable students to acquire high-level literacy including technologist ethics. On the other hand, in the doctoral program, on the basis of high achievements in the past, through the world-class study activities, we develop human resources who have the ability to plan original and creative research projects, possess leadership qualities, and can develop practical chemistry taking the lead in social transformation.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree. When selecting lecture courses, you should give priority to core courses in your area of research.

Summary of Each Research Area

◆ Inorganic Synthetic Chemistry

Inorganic chemistry is a field of study that attempts to clarify the structure and characteristics of simple bodies, and compounds of an extremely wide variety of elements and natural and artificial minerals, etc. are studied as inorganic solid chemistry. Due to the importance of the development of new materials in the current innovation of science and technology, practical applications and development of various inorganic materials based on inorganic chemistry are conducted. In particular, the importance of material synthesis by chemical methods has been widely recognized in recent years, and studies are conducted on the development of synthesis techniques by making use of the knowledge of inorganic chemistry and suggestions for new materials in the field of applied chemistry.

In Inorganic Synthetic Chemistry, based on inorganic solid chemistry, inorganic synthesis chemistry, and inorganic solid-state chemistry, students comprehensively learn the synthesis, structure, and properties of inorganic compounds and understand recent study trends through the latest literature by seminar courses. Furthermore, by taking up state-of-the-art inorganic materials, we consistently carry out establishment of synthesis methods, analysis of the structure, and evaluation of the properties to develop each person's ability to promote research.

◆ Polymer Chemistry

Polymers are an important substance group supporting social life and advanced technologies along with ceramics. Since polymers are macromolecules (e.g., for genomic DNAs, 109 dalton), it is possible to discover various new functions related to electronics, biotechnology, etc. depending on the chemical structure and order of units, combination methods and the degree of polymerization, and the assembly and arrangement of molecules. Polymer Chemistry serves as a basis for understanding and creation of these high molecular materials.

In Polymer Chemistry, students systematically learn about the synthesis and properties of polymers, biopolymers, and high polymer materials and master science and engineering of high molecular materials developed through practice from the standpoint of functional design in a new field. In addition, through experimental studies selected from advanced courses such as the electron transport system, molecular assembly, oxygen carriers, molecular magnetism, and super engineering plastics synthesis, students learn correlations of structures, properties, and functions of polymers to develop their ability to pursue original and creative studies while flexibly responding to the demands of society.

◆ Catalytic Chemistry

Catalysts are important in the production process of almost all the chemical industries including oil and petrochemistry or in all fields in which a chemical reaction is involved such as environmental, resources saving, and energy technology. Catalysts are one of the courses most studied in the field of applied chemistry and chemical engineering. Most practical catalysts are solid catalysts and the surface is involved in chemical reactions; therefore, the catalysis is complicated and includes a wide range of issues from the structures of the solid, surface, and the reaction mechanism to the analysis and design of reactors.

In Catalytic Chemistry, students systematically learn the basic theories about catalysts and catalyses and aim to comprehensively and thoroughly master the science and engineering of catalyses for representative industrial catalyst processes through seminar courses. Furthermore, by selecting a particular and advanced catalyst system and a reaction process, students develop their ability to pursue original and creative studies in the underlying catalyst science, in particular, relations between preparation and the structure of catalysts, relations between the surface and solid structures and the properties and functions, the reaction mechanism, etc.

◆ Applied Biochemistry

Biotechnology is a technology enabling reactions at normal temperatures and pressures and enables the development of an energy-saving, safe, and secure substance production process. In Applied Biochemistry, studies are conducted for establishing production methods of useful substances and developing new substance synthesis processes using microorganisms and microbial enzymes. We also advance studies on molecular breeding technologies of useful microorganisms (cell fusion and genetic engineering). The present study themes are classified into the following six items. However, the studies on each item are closely related to each other and there are many studies being advanced in boundary areas: (1) production of organic acids (mainly citric acids) and amino acids and solution of related metabolic systems, (2) molecular breeding and functional development of useful filamentous bacteria (fungi), (3) search of microbial enzymes for the synthesis of a useful carbohydrate and glycoside and solution of their properties, (4) alteration of enzyme functions and metabolism using genetic engineering, (5) applied development of green biotechnologies, and (6) search and functional development of microorganisms available for biomass conversion and environmental cleanup.

◆ Chemical Engineering

With the sophistication of the chemical industry and its related industries, process compositions have become extremely complicated and composition equipment and operating conditions have increased in variety. From an engineering point of view, which is different from the conventional and laboratory ways of thinking, methods of basic studies and R&Ds, the theory of process composition, and design methods of equipment and operations aiming at industrialization have become indispensable. In Chemical Engineering, we aim to develop and establish plans for processes consisting of the basic theory of the above-mentioned equipment and operation design and groups of equipment, new production processes based on the design theory, and process systems.

This research area is composed of the following three study fields: (1) studies based on transfer kinetics, diffusion operation, biochemical engineering, and environmental chemical engineering, (2) studies on medical chemical engineering related to the human body system including an artificial kidney and an artificial lung, and (3) studies on component separation engineering associated with the generation of solids.

◆ Synthetic Organic Chemistry

Creation of useful materials is the basis for the development of science and technology. For the creation of organic compounds with specific functions including biologically active substances and functional substances, it has become an important challenge to develop efficient organic synthesis methods as well as rational designs of these substances. Aiming at the creation of new functional substances and their efficient synthesis, in Synthetic Organic Chemistry, we search for an organic synthesis route, establish new synthesis reaction systems, develop reagents, and perform total synthesis and molecular design of biologically active substances. Through the synthesis of biologically active substances including saccharides, steroid hormones, antibiotics, and enzyme inhibitors, the development of organometallic reagents, and studies and seminars on asymmetric synthesis reactions, etc., students can gain knowledge as a researcher of organic synthetic chemistry while acquiring the latest technologies and theories of organic synthetic chemistry.

◆ Applied Physical Chemistry

Physical chemistry includes the basic areas in chemistry such as thermochemistry, chemical equilibrium, reaction kinetics, quantum chemistry, and electrochemistry, and is an essential field for students in the Department of chemistry. In this research area, in particular, we develop studies focusing on electrochemistry and surface chemistry in physical chemistry as the backbones. Under the basic principle of “creating new processes and technology areas,” the study theme of this research area is to create new materials and, while evaluating their functions, further create advanced functional materials. For that, students systematically learn the basic theories of physical chemistry, putting emphasis on the electrochemical process, and develop their ability to do research and development. In particular, in consideration of applications to the electronics field which requires a lot of advanced thin-film materials, by developing studies to cover the creation of thin films, analysis of functional characteristics, creation of various devices using these thin films, and evaluation of their characteristics, we develop researchers and engineers who can play an active role in the broad field of functional materials.

Core Courses / Recommended Courses

When core courses and recommended courses are provided by each research area of your department, take courses in accordance with the specified method.

Common to all categories for the Applied Chemistry major

	Recommended courses (common)
There are no core courses.	Advanced Inorganic Chemistry
	Advanced Organic Chemistry A
	Advanced Organic Chemistry B
	Advanced Physical Chemistry A
	Advanced Physical Chemistry B
	Advanced Chemical Engineering A
	Advanced Chemical Engineering B
	Advanced Biochemistry

Inorganic Synthetic Chemistry

Core courses	
Advanced Inorganic Chemistry	There are no recommended courses.

Polymer Chemistry

Core courses	
Advanced Organic Chemistry A,B	There are no recommended courses.

Catalytic Chemistry

Core courses	
Advanced Physical Chemistry A,B	There are no recommended courses.

Applied Biochemistry

Core courses	
Advanced Biochemistry	There are no recommended courses.

Chemical Engineering

Core courses	
Advanced Chemical Engineering A	There are no recommended courses.
Advanced Chemical Engineering B	

Synthetic Organic Chemistry

Core courses	Recommended courses
Advanced Organic Chemistry A	Advanced Organic Chemistry B
	Advanced Functional Organic Chemistry

Applied Physical Chemistry

Core courses	Recommended courses
Advanced Physical Chemistry A	Advanced Inorganic Chemistry
Advanced Physical Chemistry B	

(I) Research guidance

Course name
Research on Inorganic Synthetic Chemistry
Research on Inorganic Synthetic Chemistry
Research on Polymer Chemistry
Research on Polymer Chemistry
Research on Catalytic Chemistry
Research on Catalytic Chemistry
Research on Applied Biochemistry
Research on Applied Biochemistry
Research on Applied Electrochemistry
Research on Interface Electrochemistry
Research on Chemical Engineering
Research on Chemical Engineering
Research on Bioactive Substances
Research on Synthetic Organic Chemistry

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Advanced Inorganic Chemistry	2		2
Advanced Physical Chemistry A	2		2
Advanced Physical Chemistry B	2		2
Advanced Organic Chemistry A	2		2
Advanced Organic Chemistry B	2		2
Advanced Chemical Engineering A	2		2
Advanced Chemical Engineering B	2		2
Advanced Biochemistry	2		2

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Inorganic Solid State Chemistry A	3		3
Seminar on Inorganic Solid State Chemistry B	3	3	
Seminar on Inorganic Reaction Mechanisms A	3		3
Seminar on Inorganic Reaction Mechanisms B	3	3	
Seminar on Inorganic Materials Chemistry A	3		3
Seminar on Inorganic Materials Chemistry B	3	3	
Seminar on Hybrid Materials Chemistry A	3		3
Seminar on Hybrid Materials Chemistry B	3	3	
Seminar on Physical Chemistry of Polymers A	3		3
Seminar on Physical Chemistry of Polymers B	3	3	
Seminar on Polymer Materials A	3		3
Seminar on Polymer Materials B	3	3	
Seminar on Polymer Synthesis A	3		3
Seminar on Polymer Synthesis B	3	3	
Seminar on Biopolymers A	3		3
Seminar on Biopolymers B	3	3	

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Catalytic Processes A	3		3
Seminar on Catalytic Processes B	3	3	
Seminar on Energy and Fuel A	3		3
Seminar on Energy and Fuel B	3	3	
Seminar on Catalytic Chemistry A	3		3
Seminar on Catalytic Chemistry B	3	3	
Seminar on Organic Catalytic Reactions A	3		3
Seminar on Organic Catalytic Reactions B	3	3	
Seminar on Biochemical Mechanics A	3		3
Seminar on Biochemical Mechanics B	3	3	
Seminar on Applied Biochemistry A	3		3
Seminar on Applied Biochemistry B	3	3	
Seminar on Applied Bioscience A	3		3
Seminar on Applied Bioscience B	3	3	
Seminar on Genetic Engineering A	3		3
Seminar on Genetic Engineering B	3	3	
Seminar on Chemical Process Engineering A	3		3
Seminar on Chemical Process Engineering B	3	3	
Seminar on Separation Engineering A	3		3
Seminar on Separation Engineering B	3	3	
Seminar on Environmental Chemical Engineering A	3		3
Seminar on Environmental Chemical Engineering B	3	3	
Seminar on Synthetic Organic Chemistry A	3		3
Seminar on Synthetic Organic Chemistry B	3	3	
Seminar on Bioactive Substances Science A	3		3
Seminar on Bioactive Substances Science B	3	3	
Seminar on Synthesis of Fine Chemicals A	3		3
Seminar on Synthesis of Fine Chemicals B	3	3	
Seminar on Design of Organic Synthesis A	3		3
Seminar on Design of Organic Synthesis B	3	3	
Seminar on Electronic Materials Chemistry A	3		3
Seminar on Electronic Materials Chemistry B	3	3	
Seminar on Applied Physical Chemistry A	3		3
Seminar on Applied Physical Chemistry B	3	3	
Seminar on Physical Electrochemistry A	3		3
Seminar on Physical Electrochemistry B	3	3	
Seminar on Functional Surface Chemistry A	3		3
Seminar on Functional Surface Chemistry B	3	3	
Seminar on Reaction Engineering A	3		3
Seminar on Reaction Engineering B	3	3	
Seminar on Material Process Engineering A	3		3
Seminar on Material Process Engineering B	3	3	

Department of Life Science and Medical Bioscience

It is said that the 21st century is the era of life science. Understanding of life science at the cellular and molecular levels has been dramatically advanced and medical health care, preventive medicine, tailor-made genomic drug discovery, drug delivery system, regeneration medicine, etc. are expected as near future medical services. Firm knowledge and experiment techniques gained in the academic field of science and technology are the building blocks for the body of knowledge to realize these treatments. The integration of knowledge of science and technology is necessary for the development of new fields of life science; therefore, it is also necessary to develop human resources who can expand studies on life science at the molecular level with their knowledge of science and technology.

In the Department of Life Science and Medical Bioscience, based on the knowledge and research technologies of science and engineering, we study "life" from a foundational and application viewpoint, and develop new education by feeding back the latest knowledge gained from advanced studies. We also provide culture and scientific abilities related to the advanced fields of biomedical science through practical scientific studies and develop human resources with solid basic skills in science and engineering who can play active roles in the fields of life science, medical science, and medical engineering.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, each academic year, you must take the seminar courses provided by your supervisor
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.

Summary of Each Research Guidance

◆ Solid State Bioscience

Students learn the basics of physical and chemical properties of bio-related materials, and based on that understanding, elucidate their solid state science. Their non-linear optical and chiroptical properties are investigated from an interdisciplinary scientific viewpoint.

◆ Neurophysiology

Physiological studies of neural systems. We are working on various aspects of the nervous system from functional imaging of the brain to signal transduction mechanisms in neurons using living animals, brain tissue, and cell preparations by means of imaging and molecularbiological techniques.

◆ Molecular Brain Science

We aim to understand the molecular mechanisms of neuronal differentiation, brain formation and development, formation of neural networks, and brain functions. We conduct molecular genomics of mice and zebrafish to understand the molecular and cellular bases of higher brain functions such as emotions, and neuropsychiatric disorders. We also attempt to develop new therapeutic method for regeneration of the nervous system.

◆ Molecular Medicine and Biochemistry

Analysis of molecular mechanism of how organisms respond to their surroundings and elucidation of its pathological significance in human diseases. We investigate the molecular mechanisms in the regulation of energy metabolism in organisms by hypoxia-responsible systems. We also aim to elucidate pathophysiological significance of hypoxia responses in the development of human metabolic disease including diabetes, obesity, and fatty liver, and to develop new molecular-targeted drugs against the diseases.

◆ Molecular Oncology

Analysis of the molecular mechanism of tumorigenesis and development of novel therapeutic methods, search of novel oncogenes with the genomic and proteomic approaches, function analysis of oncogenes using cells and animals, and development of molecular-targeted drugs that suppress the function of the oncogenes in vitro and in vivo.

◆ Biomolecular Assembling Science

Construction of molecular assemblies and supramolecular structures from biomacromolecules such as proteins, nucleic acids, and polysaccharides and their derivatives with phospholipids, etc., and application studies as functional molecular devices. Development of artificial platelets, drug carriers, gene carriers, nanosheets, and probes for molecule imaging.

◆ Biomaterials Science and Engineering

The creation of intelligent systems based on micro/nano biotechnology, biointerface engineering and mechanobiology, to regulate cell behavior, including proliferation, differentiation, and signal transduction; (e.g.) Developing polymer materials as novel cell culture substrates enabling precisely configuring mutual cell positions and fabrication of their networks.

◆ Biomolecular Science and Engineering

Application of environmental bio/gene resources. Efficient acquisition and analysis of functions of microorganisms and genomes. Development and application of an identification system for target organisms based on their DNA sequences.

◆ Environmental Biotechnology

Molecular ecological studies and simulation of ecological structure of environmental microorganisms, search of new compounds by using unknown genes from uncultured bacteria, foundational and applied study of biofilm formation and suppression, development of simple, rapid, and high-throughput gene analysis method.

(I) Research guidance

Course name
Research on Solid State Bioscience
Research on Neurophysiology
Research on Molecular Brain Science
Research on Molecular Medicine and Biochemistry
Research on Molecular Oncology
Research on Biomolecular Assembly
Research on Biomaterials Science and Engineering
Research on Biomolecular Science and Engineering
Research on Environmental Biotechnology

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Brain Science Lecture A	2	3	
Brain Science Lecture B	2		3
Advanced Neuroscicence	2		2
Advanced Solid State Bioscience	2		2
Advanced Molecular Oncology	2		2
Advanced Medical Biochemistry	2		2(intensive)
Advanced Topics on Biomolecular Assembly	2	2	
Advanced Bioengineering	2	2	
Advanced Biomolecular Science and Engineering	2	2(first half)	
Advanced Medical Science of the Cardiovascular System	2		2(intensive)
Advanced Molecular Biology and Bioscience	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Environmental Biotechnology A	3		3
Seminar on Environmental Biotechnology B	3	3	
Seminar on Environmental Biotechnology C	3		3
Seminar on Environmental Biotechnology D	3	3	
Seminar on Biomolecular Assembly A	3		3
Seminar on Biomolecular Assembly B	3	3	
Seminar on Biomolecular Assembly C	3		3
Seminar on Biomolecular Assembly D	3	3	
Seminar on Solid State Bioscience A	3		3
Seminar on Solid State Bioscience B	3	3	
Seminar on Solid State Bioscience C	3		3
Seminar on Solid State Bioscience D	3	3	
Seminar on Neurophysiology A	3		3
Seminar on Neurophysiology B	3	3	
Seminar on Neurophysiology C	3		3
Seminar on Neurophysiology D	3	3	
Seminar on Molecular Brain Science A	3		3
Seminar on Molecular Brain Science B	3	3	
Seminar on Molecular Brain Science C	3		3
Seminar on Molecular Brain Science D	3	3	
Seminar on Molecular Medicine and Biochemistry A	3		3
Seminar on Molecular Medicine and Biochemistry B	3	3	
Seminar on Molecular Medicine and Biochemistry C	3		3
Seminar on Molecular Medicine and Biochemistry D	3	3	
Seminar on Molecular Oncology A	3		3
Seminar on Molecular Oncology B	3	3	
Seminar on Molecular Oncology C	3		3
Seminar on Molecular Oncology D	3	3	
Seminar on Biomaterials Science and Engineering A	3		3
Seminar on Biomaterials Science and Engineering B	3	3	
Seminar on Biomaterials Science and Engineering C	3		3
Seminar on Biomaterials Science and Engineering D	3	3	
Seminar on Biomolecular Science and Engineering A	3		3
Seminar on Biomolecular Science and Engineering B	3	3	
Seminar on Biomolecular Science and Engineering C	3		3
Seminar on Biomolecular Science and Engineering D	3	3	

Department of Electrical Engineering and Bioscience

In this Department, we educate students on cutting-edge research on electrical systems, electronic systems, information systems, life systems, and their boundary areas so that students can gain knowledge from basic to specialized levels.

The electrical and electronic information-communication systems field has begun to interact with other fields of science and engineering as well as with life-related science and technology due to its innovative progress. The relationship between electricity and life has been playing a more important role in leading an affluent social life. Every aspect from the basics to the applications of vital life function equipment, DNA chips, neurochips, development research of biologically-relevant electrical and electronic equipment for understanding the intracellular information transfer mechanism and brain functions, the development of information communication equipment, and the construction of networks for advanced medical treatment are all examples of this. As is clearly seen from the above, the social need for human resources in interdisciplinary areas including electrical and electronic information-communication systems and life science has been increasing more and more.

On the other hand, now that genome projects have finished investigating the DNA sequences of many species including human beings, studies in the field of life science have greatly shifted to solve the structures and functions of proteins and the workings of cells as systems of their interactions. As mentioned above, working with the electrical and electronic information-communication systems with specialties in the control theory, the circuit theory, computer science, simulation technologies, etc. is indispensable for developing studies on element assemblies from genes to systems. It is also necessary to develop measurement techniques such as nanotechnology and molecule measurement technologies for the research development of life science.

This Department has been established to respond to the demand of the times on the above electrical and electronic information-communication systems and life systems for the purpose of establishing an “intellectual cooperation body.”

Guidelines for earning a Master’s Degree

1. To be granted a master’s degree, you must earn 30 or more credits, receive the required research guidance, and pass a master’s thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 14 credits of seminar courses are taken, credits in excess of 14 are not counted toward the number of credits required for the degree.
3. Please note that “Advanced Seminars A and B” are required courses.
4. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.

(I) Research guidance

Course name
Research on Power Systems Engineering
Research on Applications of Superconductivity
Research on Photonics
Research on Computer-aided Electromagnetics
Research on Advance Control
Research on Intelligent Control
Research on Information-based Learning Systems
Research on Pharmacology
Research on Neurochemistry
Research on Structural Biology and Biochemistry
Research on Optical Properties of Condensed Matter
Research on Dynamics of Biological Systems
Research on Molecular Networks in Cells
Research on Molecular and Cellular Biosciences
Research on Probabilistic Information Processing
Research on Electronic and Photonic Materials
Research on Quantum Materials Science
Research on Next-generation Electrical Energy Systems
Research on Dielectric Materials Research

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Power Systems Theory	2		2
Molecular Cell Biology	2	2	
Electronic and Photonic Materials	2	2	
Quantum Materials Science	2		2
Electronic Properties of Dielectrics	2	2	
Topics on Probabilistic Information Processing	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Power Systems Theory A	3		3
Seminar on Power Systems Theory B	3	3	
Seminar on Power Systems Theory C	3		3
Seminar on Power Systems Theory D	3	3	
Seminar on Applications of Superconductivity A	3		3
Seminar on Applications of Superconductivity B	3	3	
Seminar on Applications of Superconductivity C	3		3
Seminar on Applications of Superconductivity D	3	3	
Seminar on Photonics A	3		3
Seminar on Photonics B	3	3	
Seminar on Photonics C	3		3
Seminar on Photonics D	3	3	
Seminar on Computer-aided Electromagnetics A	3		3
Seminar on Computer-aided Electromagnetics B	3	3	
Seminar on Computer-aided Electromagnetics C	3		3
Seminar on Computer-aided Electromagnetics D	3	3	
Seminar on Advance Control A	3		3
Seminar on Advance Control B	3	3	
Seminar on Advance Control C	3		3
Seminar on Advance Control D	3	3	
Seminar on Intelligent Control A	3		3
Seminar on Intelligent Control B	3	3	
Seminar on Intelligent Control C	3		3
Seminar on Intelligent Control D	3	3	
Seminar on Information-based Learning Systems A	3		3
Seminar on Information-based Learning Systems B	3	3	
Seminar on Information-based Learning Systems C	3		3
Seminar on Information-based Learning Systems D	3	3	
Seminar on Pharmacology A	3		3
Seminar on Pharmacology B	3	3	
Seminar on Pharmacology C	3		3
Seminar on Pharmacology D	3	3	
Seminar on Neurochemistry A	3		3
Seminar on Neurochemistry B	3	3	
Seminar on Neurochemistry C	3		3
Seminar on Neurochemistry D	3	3	
Seminar on Structural Biology and Biochemistry A	3		3
Seminar on Structural Biology and Biochemistry B	3	3	
Seminar on Structural Biology and Biochemistry C	3		3
Seminar on Structural Biology and Biochemistry D	3	3	
Seminar on Optical Properties of Condensed Matter A	3		3
Seminar on Optical Properties of Condensed Matter B	3	3	
Seminar on Optical Properties of Condensed Matter C	3		3
Seminar on Optical Properties of Condensed Matter D	3	3	
Seminar on Dielectric Materials A	3		3
Seminar on Dielectric Materials B	3	3	
Seminar on Dielectric Materials C	3		3

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Dynamics of Biological Systems A	3		3
Seminar on Dynamics of Biological Systems B	3	3	
Seminar on Dynamics of Biological Systems C	3		3
Seminar on Dynamics of Biological Systems D	3	3	
Seminar on Molecular Networks in cells A	3		3
Seminar on Molecular Networks in cells B	3	3	
Seminar on Molecular Networks in cells C	3		3
Seminar on Molecular Networks in cells D	3	3	
Seminar on Molecular and Cellular Biosciences A	3		3
Seminar on Molecular and Cellular Biosciences B	3	3	
Seminar on Molecular and Cellular Biosciences C	3		3
Seminar on Molecular and Cellular Biosciences D	3	3	
Seminar on Probabilistic Information Processing A	3		3
Seminar on Probabilistic Information Processing B	3	3	
Seminar on Probabilistic Information Processing C	3		3
Seminar on Probabilistic Information Processing D	3	3	
Seminar on Electronic and Photonic Materials A	3		3
Seminar on Electronic and Photonic Materials B	3	3	
Seminar on Electronic and Photonic Materials C	3		3
Seminar on Electronic and Photonic Materials D	3	3	
Seminar on Quantum Materials Science A	3		3
Seminar on Quantum Materials Science B	3	3	
Seminar on Quantum Materials Science C	3		3
Seminar on Quantum Materials Science D	3	3	
Seminar on Next-generation Electrical Energy Systems A	3		3
Seminar on Next-generation Electrical Energy Systems B	3	3	
Seminar on Next-generation Electrical Energy Systems C	3		3
Seminar on Next-generation Electrical Energy Systems D		3	
Advanced Seminar A	1	◎	
Advanced Seminar B	1		◎

Department of Integrative Bioscience and Biomedical Engineering

Along with the improvement in efficiency and labor saving of the industrial sector, industrial technologies such as systems and mass production have reached a period of maturity, and development has gradually shifted from uniformity to diversification, from macro to micro, and from structure to function, and eventually extended into fields aimed at “life” as well. Studies covering these fields are life science and medical engineering, and it is a department characteristic of the Department of Integrative Bioscience and Biomedical Engineering that it has organized a new interdisciplinary field that fuses these sciences and engineering. In addition, based on academic cooperation with Tokyo Women’s Medical University, we are proceeding with the development of an original educational and research environment by adding medicine to science and engineering. Many of the studies are carried out at the Center for Advanced Biomedical Sciences (TWins).

Students who received a solid undergraduate training education can smoothly enter into this Department which has “life” as a key word to study in a unique curriculum including Bioethics and Integrative Bioscience, Biomedical Engineering (both are required courses), etc. Furthermore, students can carry out original and creative studies in the environment where the faculty of the life-related fields in the Departments of Modern Mechanical, Electrical Engineering and Bioscience, Electronic and Photonic Systems, Physics, Chemistry and Biochemistry, and Applied Chemistry of the Faculty of Science and Engineering, the faculty of the Graduate School of Human Sciences, and the faculty belonging to Biology of the School of Education are gathered. We believe that the mission of this Department is to strive to develop young human resources such as engineers and basic scientists who can take on the challenge of developing new bio-industries that meet social needs.

Guidelines for earning a Master’s Degree

1. To be granted a master’s degree, you must earn 30 or more credits, receive the required research guidance, and pass a master’s thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please note that Bioethics and Integrative Bioscience and Biomedical Engineering are core (required) courses.
4. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.

[Note]

Students cannot obtain credits from combined undergraduate school lectures if they have already earned them in undergraduate schools.

Summary of Studies of the Department of Integrative Bioscience and Biomedical Engineering

To make the most of its characteristics as an interdisciplinary field, this Department is not subdivided into research areas by study content. However, the fields of Biological System and Biomolecular Function are available depending on the way study is approached.

◆ Biological System

We mainly study biological systems such as intercellular, interorgan, cells and organs, individuals and species, and life and environment systems. The studies mainly focus on the development of artificial organs, the development of humanoid robots and robots for medical care, the measurement of medical electronics, the molecular evolution of gonadotropic hormones, the cloning and function analysis of neuropeptides, the molecular structure involved in sex determination, the molecular structure of molecular memories in occurrence, and plant ecology.

◆ Biomolecular Function

Studies of molecular mechanisms of life and cell functions are conducted. The studies mainly focus on the asymmetric synthesis of chiral molecules, total synthesis of natural biologically active substances, spectroscopy diagnosis and development of laser surgery methods of diseases, single-molecule microscopic analysis of biomolecular motors, single-molecule imaging of intracellular signal-transducing mechanisms, movements, total synthesis and structure-activity correlations of antineoplastic compounds, search of cell death inducing and suppressive substances, hematopoietic regulation, development, and regeneration, etc.

Core Courses / Recommended Courses

When core courses and recommended courses are provided by each research area of your department, take courses in accordance with the specified method.

Core courses

Bioethics
Integrative Bioscience and Biomedical Engineering

There are no recommended courses.

(I) Research guidance

Course name
Research on Medical Applications of Mechanical Engineering
Research on Biorobotics
Research on Biomolecular Engineering
Research on Experimental Biophysics
Research on Molecular Biophysics
Research on Regulation Biology
Research on Molecular Physiology
Research on Integrative Brain Science

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Internal Organ Engineering	2	2	
Advanced Biomolecular Science and Engineering	2	2	
Bioethics	2		2
Integrative Bioscience and Biomedical Engineering	2	2	
Molecular Physiology	2		2
Advanced Biophysics A	2		2
Advanced Biophysics B	2	2	
Scientific Communication Ⅰ	2		2
Scientific Communication Ⅱ	2	2	
Round Table Discussion on Landmark Papers	2		2
Scientific Presentation Workshop	2	2	
Integrative Brain Sciences	2		2

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Medical Applications of Mechanical Engineering A	3		3
Seminar on Medical Applications of Mechanical Engineering B	3	3	
Seminar on Medical Applications of Mechanical Engineering C	3		3
Seminar on Medical Applications of Mechanical Engineering D	3	3	
Seminar on Biorobotics A	3		3
Seminar on Biorobotics B	3	3	
Seminar on Biorobotics C	3		3
Seminar on Biorobotics D	3	3	
Seminar on Systems Biology for Medicine A	3		3
Seminar on Systems Biology for Medicine B	3	3	
Seminar on Systems Biology for Medicine C	3		3
Seminar on Systems Biology for Medicine D	3	3	
Seminar on Biomolecular Engineering A	3		3
Seminar on Biomolecular Engineering B	3	3	
Seminar on Synthesis of Biologically Active Molecules A	3		3
Seminar on Synthesis of Biologically Active Molecules B	3	3	
Seminar on Experimental Biophysics A	3		3
Seminar on Experimental Biophysics B	3	3	
Seminar on Experimental Biophysics C	3		3
Seminar on Experimental Biophysics D	3	3	
Seminar on Molecular Biophysics A	3		3
Seminar on Molecular Biophysics B	3	3	
Seminar on Molecular Biophysics C	3		3
Seminar on Molecular Biophysics D	3	3	
Seminar on Cell Biology A	3		3
Seminar on Cell Biology B	3	3	
Seminar on Cell Biology C	3		3
Seminar on Cell Biology D	3	3	
Seminar on Molecular Functions and Physiology A	3		3
Seminar on Molecular Functions and Physiology B	3	3	
Seminar on Molecular Functions and Physiology C	3		3
Seminar on Molecular Functions and Physiology D	3	3	
Seminar on Integrative Brain Sciences A	3		3
Seminar on Integrative Brain Sciences B	3	3	
Seminar on Integrative Brain Sciences C	3		3
Seminar on Integrative Brain Sciences D	3	3	

Department of Nanoscience and Nanoengineering

Materials science which supported industrial society in the 20th century and electronics which served as the driving force for the advent of the information society are making new progress while including sprouts of new phenomena, materials, process methods, new functional devices, etc. as symbolized in keywords such as cooperative phenomenon, bio-materials, electrochemistry, and nanostructural property. Great expectations have been placed on the integration of these sciences that can create innovative technologies like nanotechnology which cannot be achieved by a single field and that leads to the creation of new industries in the 21st century. With the faculty of this Department as the core staff, for five years from 2001, the Center of Excellence (COE) formation plan on "molecular nano-engineering" related to the Grant-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology was promoted and the environment is ready to powerfully advance this distinctly interdisciplinary field of nanoscience and nanoengineering.

This field is an interdisciplinary area. Students who received basic education at each department can smoothly enter into this Department, and receive education and engage in studies in a completely new environment to acquire the ability to contribute to the creation of new industries by applying nanotechnology. At the same time, students can nurture their potential to develop a completely new academic field. This Department has three fields: Nanoelectronics, Nanochemistry, and Solid-state Nanoscience. Common lectures are set up in the Department and research guidance, seminar, and lecture courses are set up in each field. Students belong to one of the research fields and take courses mainly in the field, following the guidance of their supervisor in charge of research guidance.

Guidelines for earning a Master's Degree

1. To be granted a master's degree, you must earn 30 or more credits, receive the required research guidance, and pass a master's thesis review.
2. Among the 30 credits required for the degree, 12 credits must be earned from seminar courses. Each academic year, you must take the seminar courses provided by your supervisor. If more than 12 credits of seminar courses are taken, credits in excess of 12 are not counted toward the number of credits required for the degree.
3. Please consult with your supervisor regarding what other courses should be taken to fulfill the credit requirement toward your degree.

Summary of Each Research Area

◆ Nanoelectronics

This field aims at the development of devices that utilize the smallest information carriers such as electrons and photons not only in the field of IT technology, but in biotechnology and environmental science. Electrical engineering is used as the basic scientific discipline for conducting nano-scale physical, chemical, and biological phenomenon analysis and research of engineering applications.

◆ Nanochemistry

In this field, chemical approaches such as precision synthesis and reaction control are used to create nano-material with controlled structures and functions at the atomic/molecular levels and to develop new reaction processes for the purpose of this creation. We also conduct research on various device systems utilizing nano-material functions.

◆ Solid-state Nanoscience

Nano-scale refers to a field at which remarkable quantum effects are observed. It also manifests the extreme limit of possible artificial manipulation. The purpose of this field is to explicate the structure, characteristics, and related phenomena of nano-scale material at the quantum mechanical level. The field also aims at doing studies on artificial manipulation of the structure and related phenomena. This field develops researchers and engineers who can stand on the leading edge of the times with a well developed sense for physics.

(I) Research guidance

Course name
Research on Nanodevices
Research on Microsystems
Research on Molecular Nanoengineering
Research on Nanomaterials Informatics
Research on Surface Chemistry of Nanostructured Materials
Research on Surface Physics and Nanoscience
Research on Nanomaterials
Research on Electrochemical Nano-Systems

(II) Lecture courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Nanodevice Engineering	2	2	
Nanobiotechnology Fusion Systems	2	2	
Molecular Nanoengineering	2	2	
Computational Experiments	2	2	
Nanochemical Systems	1	2(first half)	
Nanomaterials	2	2	
Experiments in Nanoscience and Nanoengineering	2	2	

(III) Seminar courses

Course name	Credit	Class hours per week	
		Fall semester	Spring semester
Seminar on Nanoelectronics A	3		3
Seminar on Nanoelectronics B	3	3	
Seminar on Nanoelectronics C	3		3
Seminar on Nanoelectronics D	3	3	
Seminar on Microsystem Engineering A	3		3
Seminar on Microsystem Engineering B	3	3	
Seminar on Microsystem Engineering C	3		3
Seminar on Microsystem Engineering D	3	3	
Seminar on Molecular Nanoengineering A	3		3
Seminar on Molecular Nanoengineering B	3	3	
Seminar on Molecular Nanoengineering C	3		3
Seminar on Molecular Nanoengineering D	3	3	
Seminar on Nanomaterials for Informatics A	3		3
Seminar on Nanomaterials for Informatics B	3	3	
Seminar on Nanomaterials for Informatics C	3		3
Seminar on Nanomaterials for Informatics D	3	3	
Seminar on Nanofunctional Surface Chemistry A	3		3
Seminar on Nanofunctional Surface Chemistry B	3	3	
Seminar on Nanofunctional Surface Chemistry C	3		3
Seminar on Nanofunctional Surface Chemistry D	3	3	
Seminar on Surface Physics of Nanomaterials A	3		3
Seminar on Surface Physics of Nanomaterials B	3	3	
Seminar on Surface Physics of Nanomaterials C	3		3
Seminar on Surface Physics of Nanomaterials D	3	3	
Seminar on Nanomaterials A	3		3
Seminar on Nanomaterials B	3	3	
Seminar on Nanomaterials C	3		3
Seminar on Nanomaterials D	3	3	
Seminar on Electrochemical Nano-Systems A	3		3
Seminar on Electrochemical Nano-Systems B	3	3	
Seminar on Electrochemical Nano-Systems C	3		3
Seminar on Electrochemical Nano-Systems D	3	3	

7 How to Obtain a Teacher's Specialized License

Students who want to obtain a teacher's specialized license **should read the Guide to Teacher Training Program issued by the Teacher Training Program of the School of Education of Waseda University thoroughly, and take required courses conducted in Japanese in a well-planned manner from the first year.** For details on how to obtain a teacher's specialized license, please contact the Center for Science and Engineering.

8 Class Time Slots

The class time slots of Waseda University are as follows:

Period	1	2	3	4	5	6	7
Time	9:00–10:30	10:40–12:10	13:00–14:30	14:45–16:15	16:30–18:00	18:15–19:45	19:55–21:25

9 Notes on Preparing Reports or Theses

Using all or part of text written by others or materials from a book, a website, or other publications in a report, thesis, etc. without mentioning the source constitutes fraudulent use or plagiarism, and is a punishable offence.

The general rule in quoting or referring to others' sentences or materials when offering your opinions is to specify the quoted part with quotation marks ("") or in other ways and to give the source (specify the author's name, title, page number, publisher, and year of publication, or the website address and the date of access) correctly. However, quotations should be minimized because quoting a large part of a book or website requires approval of the author for quotation or reprint.

10 Posting of Grades

Grades are announced on the Waseda-net portal on a date specified for each semester. Check the date of grade announcement in the website of the Faculty of Science and Engineering.

Grades of lecture courses, seminar courses, and the master's thesis are indicated by A^+, A, B, C, and F. A^+ to C are passing grades, and F is a failing grade. Research guidance grades are indicated by P and Q. P is a passing grade and Q is a failing grade. In addition to these grades, symbols H and * are used in a grade report.

H ... Means that the grade for the course is on hold. Assignments, etc. may be announced by the instructor in charge. Check the bulletin board or check with the instructor. If you do not follow the instructor's instructions, an F is automatically given at the end of the year.

* .... Means that you have registered that course, but the instructor in charge has not given grades for the course.

Grade	A^+	A	B	C	F	H
Score	100–90	89–80	79–70	69–60	59–	
Transcript	A^+	A	B	C	No indication	
Judgment	Pass				Fail	

Notice on GPA

1. Calculation Formula

Waseda University uses an evaluation system with a set of conversion rates called Grade Points (4 points for A+, 3 points for A, 2 points for B, 1 point for C, and zero point for Failing Grades).

A Grade Point Average (GPA) is a score calculated by multiplying "total number of credits by grade point(A+, A, B etc.)" and "corresponding grade point (4 for A+, 3 for A etc.)", then totaling the obtained figures for the all grades and dividing the result by "total number of registered credits".

The total number of registered credits includes credits earned for failing grades.

This will be calculated in the following formula:

<Calculation Formula>

$$\frac{\{(\text{No. of A+ credits} \times 4) + (\text{No. of A credits} \times 3) + (\text{No. of B credits} \times 2) + (\text{No. of C credits} \times 1) + (\text{No. of Failing Grades} \times 0)\}}{\text{Total number of registered credits}} = \text{GPA}$$

*The GPA will be rounded to the second decimal place.

2. Subjects used in the GPA calculation

The GPA calculation considers only the subjects registered as the subjects to count toward graduate credits. However, the following cases will not be subject to the GPA calculation even if the subject is counted toward graduate credits.

・P,Q

・N

・H（※H grade is included in the GPA calculation after the subjects in question are finally confirmed to have passed or failed.)

3. GPA on Grade Report and Transcript of Academic Record

Please note that the GPA will appear on the Grade Report, but not on the Transcript of Academic Record. We can issue a "Transcript of Academic Record / GPA" indicating the GPA and the grades used in the GPA calculation.

Ⅳ

Student Life

1	Compass (Online Student Life Manual) & International Student Handbook
2	Faculty of Science and Engineering Website
3	Student Number
4	Student Consultation
5	Employment
6	Student Identification Card
7	Issuance of Various Certificates
8	Changes in the School Register
9	Scholarships
10	Rules on Use of Bulletin Boards
11	Use of Classrooms and Common Seminar Rooms
12	Extracurricular Activities
13	Safety Management
14	Study Abroad
15	Nonsmoking Campus
16	Ban on Commuting by Bicycle, Motorcycle or Car
17	Library
18	Computer Rooms
19	Experimental Facilities
20	Health Support Center
21	Transportation Strikes and Classes
22	Contingency Measures Due to Severe Weather

1 Compass (Online Student Life Manual) & International Student Handbook

Compass (Online Student Life Manual)

While this Handbook provides a guide to learning at the Faculty of Science and Engineering, the Compass (online student life manual) provides a guide to school life at Waseda University. The address of the website is: http://www.waseda.jp/student/compass/index-e.html

International Student Handbook

The International Student Handbook lists the services and programs available at Waseda University for international students. It also contains important information on daily life in Japan such as immigration procedures. The handbook is distributed for free at the International Students' Orientation held by the Center for International Education. It is also available on at: http://www.cie-waseda.jp/lifeatwaseda/handbook/index.html

2 Faculty of Science and Engineering Website

The website of the Faculty of Science and Engineering provides various information regarding admission procedures, academic matters, and student affairs. The address of the website is: http://www.sci.waseda.ac.jp/english/index.html

3 Student Number

A specific student number is assigned to every student when he/she is enrolled. It is an 8-digit number. The first 2 digits represent the school code and the next 2 digits represent the year of enrollment (the last 2 digits of the year). The letter “G” in the next position indicates that the student is an IPSE student.

The 6th digit represents the department code (refer to “Department codes”) and the last 2 digits represent the student number.

A check digit (CD) is added after each student number, which is used when it is entered into a computer. A CD is added to prevent errors during number entry into a computer.

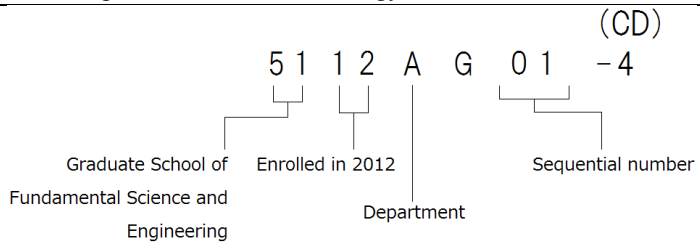
<School Codes>

51	Graduate School of Fundamental Science and Engineering
52	Graduate School of Creative Science and Engineering
53	Graduate School of Advanced Science and Engineering

<Department Codes>

Graduate School of Fundamental Science and Engineering	
A	Department of Pure and Applied Mathematics
B	Department of Computer Science and Engineering
C	Department of Applied Mechanics
D	Department of Electronic and Photonic Systems
E	Department of Intermedia Art and Science

Graduate School of Creative Science and Engineering	
A	Department of Architecture
B	Department of Modern Mechanical Engineering
C	Department of Industrial Management and Systems Engineering
D	Department of Civil and Environmental Engineering
E	Department of Earth Resources and Environmental Engineering
F	Department of Business Design & Management
Graduate School of Advanced Science and Engineering	
A	Department of Pure and Applied Physics
B	Department of Chemistry and Biochemistry
C	Department of Applied Chemistry
D	Department of Life Science and Medical Bioscience
E	Department of Electrical Engineering and Bioscience
F	Department of Integrative Bioscience and Biomedical Engineering
G	Department of Nanoscience and Nanoengineering
-	Joint Department of Advanced Biomedical Sciences
-	Joint Department of Advanced Health Science
-	Joint Department of Nuclear Energy.



4 Student Consultation

Graduate students should consult their supervisor if they have any concerns regarding their studies. Contact information for other resources is listed below.

(1) Center for Science and Engineering

The Center, which is composed of General Affairs Section and Academic and Student Affairs Section, provides consultation on all academic matters including course registration, classes, examinations, grades, enrollment (leave of absence, studying abroad, withdrawal, etc.), classroom reservations, and scholarships. The Center also manages LOST and FOUND articles. If you have questions about any of these matters, contact the office as needed.

Contact Information:

[Address] 3-4-1 Okubo, Shinju-ku, Tokyo 169-8555
(1st floor, Bldg.No. 51, Nishi-Waseda Campus)
[Tel / Fax] 03-5286-3002 / 03-5286-3500
[E-mail] soumu@sci.waseda.ac.jp (General Affairs Section)
gakumu@sci.waseda.ac.jp (Academic and Student Affairs Section)
[URL] http://www.sci.waseda.ac.jp/english/index.html

Office hours and holidays:

Monday through Saturday: 9:00 to 17:00
* The office is closed between 12:30 and 13:30 on Saturdays and during no class periods.

Holidays: Saturdays during the summer and winter holiday periods, Sundays, national holidays, anniversary of the university founding (October 21), summer school closure and winter school closure

(Note) Office processing may take longer during the summer and winter holiday periods than during the normal business hours.

(2) How to contact part-time lecturers

Contact information (addresses, telephone numbers, etc.) of part-time lecturers are not made public. To contact a part-time lecturer, put necessary documents in an envelope with the lecturer's name and your address and name, put a stamp, seal the envelope, and bring it to the *Kyoinshitsu* (faculty room, Building No. 51, 2nd floor).

* You can check the room numbers of *kenkyushitsu* (faculty labs) or e-mail addresses of full-time faculty in the syllabus or websites.

(3) Center for International Education (CIE)

The Center for International Education (CIE) provides various supports for international students. Contact the CIE office whenever you have questions or concerns about living in Japan.

Contact Information:

[Address] 1-7-14 Nishi-Waseda, Shinju-ku, Tokyo 169-0051 (4th floor, Bldg.No. 22, Waseda campus)
[Tel / Fax] 03-3207-1454 / 03-3202-8638
[E-mail] cie@list.waseda.jp
[URL] http://www.cie-waseda.jp/en/
[Office hours] Monday through Saturday 9:00 – 17:00

(4) Harassment Prevention Office

A consultation service is provided, with which students or teaching staff victimized by sexual harassment (sexual words or actions), academic harassment (words or actions related to study, education or research) or power harassment (words or actions from a position of power or an official position) can lodge a complaint or receive counseling about the harassment without anxiety. When a complaint about harassment is filed, effective measures including strict punishments are taken based on appropriate investigations and careful procedures. Special heed is paid to respecting the privacy and confidentiality of those involved in the harassment, including the persons concerned, those who are responsible for supervision or guidance, and other relevant persons.

Harassment Q&A

Q. What is harassment?
A. Harassment is remarks or actions that make others feel disadvantaged or discomforted, and/or violations of dignity based on sex, social status, race, nationality, beliefs, age, occupation, physical disabilities and other such attributes, or about overall personal character. There are various forms of harassment in the university context: sexual harassment; academic harassment related to study, education, and/or research; and power harassment on the basis of superior status or job-related position.

Q. Why is harassment an issue?
A. Harassment is a violation of human rights. A casual act or remark may cause unbearable pain and suffering for the other person. It is not unusual for this to disrupt daily life. It is important to put yourself in the other person's shoes and have high awareness. In order to do so, knowledge and understanding of the issues is necessary. To this end, the Harassment Prevention Committee has established Harassment Prevention Guidelines, developed countermeasures, and made information readily available through pamphlets and a website. Please utilize these resources.
URL for the Harassment Prevention Committee
http://www.waseda.jp/stop/

Q. In what kinds of situations do students encounter harassment?
A. Sadly, academic/sexual harassment may occur in courses, lectures or seminars; sexual harassment and power harassment may occur in student clubs and activities.

Q. Can students be the aggressor?
A. Yes. Repeated sexual comments at student club parties, forcing others to drink, aggressively pursuing someone to the point that they feel uncomfortable and other such situations can be considered sexual or power harassment.

Q．If I am harassed, where can I go for advice?

A．Please consult the Harassment Prevention Office. See below for details regarding hours, methods, contact info, etc.

Q．What can the Harassment Prevention Office do for me?

A．A specialist consultant will listen to details regarding the case. In many cases, resolution can be brought about at this stage. If specific action against the aggressor is desired, the Grievance Committee will determine whether or not to file a complaint. If a complaint is filed, the persons concerned will be interviewed and appropriate resolution of issues will be sought. Strict confidentiality and the prevention of revenge are guaranteed. Please feel secure in requesting a consultation. External advisory offices are also introduced on the website.

Q．I'm not sure if it is harassment but is it OK to ask for advice? Maybe I should just put up with it.

A．Feelings differ quite a bit from person to person, so even if another person may not feel that it is harassment, the actual individual's subjective feelings are important. Please come to the Harassment Prevention Office for advice.

Q．A friend has come to me for advice. What should I do?

A．If a friend consults you, please listen to them seriously and sympathetically. Advise them to consult a specialist such as the Harassment Prevention Office in order to deal with the issue appropriately.

Consultation Desk: Harassment Prevention Office

Consultations can be made by phone, email, fax, or letter. Anonymous consultation is possible before coming to the office. Please book an appointment by phone when coming to the office.

【℡】03-5286-9824　A telephone answering available

【Fax】03-5286-9825

【E-mail】stop＠list.waseda.jp

【URL】http://www.waseda.jp/stop/

【Hours】Mon～Fri 9:30-17:00

【Office Location】2F Bldg 24-8, Waseda University, 1-104, Totsuka-machi Shinjuku-ku, Tokyo

5 Employment

(1) Job hunting

Science and engineering students can apply to companies for a job under two different systems: the open application system and the recommendation system. The open application system allows students to apply directly to companies for a job according to job postings by companies. The recommendation system, a unique job application style for science and engineering students, is based on requests from companies to recommend applicants and, in response, the university (undergraduate schools, departments, etc.) recommends students. Companies may specify a department or a quota, so the university (undergraduate schools, departments, etc.) will ask for interested students and decide which individuals to recommend. A selection process is conducted if the number of applications exceeds the quota. For more details, refer to the career advisors of your department.

(2) Career advisors' guidance

Each department has career advisors who provide career guidance for graduating students. They provide appropriate and necessary guidance or advice on job hunting or going on to graduate school.

Students must report their job hunting activities to career advisors, including any informal job offers ("*Naitei*").

(3) Career Center

The Career Center in the Toyama Campus provides a wide variety of services ranging from how to go about job-hunting in Japan to supporting applications for a "job-hunting visa". The Career Center also periodically sends out emails of job listings for foreign students. To be placed on the mailing lists for this information, please send an email to career@list.waseda.jp with stating your full name and student ID number.

<Major activities>

Career workshop (career experts give lectures on such topics as relationship between society and career planning.)

Other events to support career building (events to communicate with working people including alumni.)

Career support events (career guidance, workshops to learn about industries, seminars to learn manners, and mini-seminars on job hunting.)

Company and recruitment information (through "Career Compass" in Waseda-net portal)

Introduction of internships and related seminars

Visa application support ("job-hunting" visa)

Contact Information:

[Address] 3rd floor of the Student Union Building, Building No. 30 in the Toyama Campus
[Tel] 03- 3203- 4332
[E-mail] career@list.waseda.jp
[URL] http://www.waseda.jp/career/
[Office hours] Weekdays: 9:00 – 18:00 Saturday: 9:00 – 17:00

(4) Career Information room

(i) Job-postings (cards) for science and engineering students, company profiles and other materials are available in the career information room located in the Building 61, International Student Lounge and Career Information Room.

(ii) In the Career Information Room in Building 61, you can get information on recruiting (mainly for humanities students), various companies, and government and municipal offices, and find reference books to study industries or companies, information magazines, job hunting experience notes from your senior schoolmates and other materials.

6 Student Identification Card

Your student identification card can be used as an ID, and you may be required to present it in various academic situations. So always carry your student identification card with you and be careful not to damage or lose it.

The student identification card consists of a card and a back side sticker in which the validity year is printed. The card is not valid until the back side sticker is put on to the back side of the card. A student identification card is valid for 1 year, specifically between April 1st and March 31st of the year printed on the sticker on the back of the card. Put your name in the signature space of the front surface.

(1) Issuance

For new students, a student identification card is issued in exchange for his/her examination admission card.

For second year students or above, a back side sticker is issued at the end of the fall semester. The student identification card can be renewed by replacing the sticker for the previous year with the new sticker.

If you want to change the picture on your student identification card, which is to be used while you are in school, it can be changed for free only once while in school. In that case, go to the Center for Science and Engineering and ask for a change of picture.

(2) Lost card

If you lose your student identification card, report the loss of your card to the police immediately because it may be used fraudulently. Then, go through the reissuance procedure at the Center for Science and Engineering.

(3) Reissuance

To apply for reissuance of a lost card, submit the Application for Reissuance with a color photograph of your face to the Office of the Faculty of Science and Engineering. A fee of 2,000 yen is charged for reissuance.

(4) Presentation

Students must present their student identification card when they take examinations, use the Waseda University Library or students' reading rooms, apply for issuance of various certificates or student discount cards ("*Gakuwari*"(学割)), receive handouts or are requested to present it by the faculty or staff member of the university.

(5) Invalidation

When your status as a student ends following graduation or withdrawal, your student identification card is invalidated. Immediately return the card to the Center for Science and Engineering. When you graduate from the university, you are granted a diploma in exchange for your student identification card.

7 Issuance of Various Certificates

The Center for Science and Engineering issues certificates listed in the following table. Certificates are basically issued on the spot, but you should request for issuance of a certificate well in advance because it may take several days to issue one due to system maintenance or depending on the certificate type.

(1) Issuance of certificates costs you some fees.

Certificate issued to students: 200 yen per copy (including certificates requested by students by the end of the month of his/her graduation date)

Certificate issued to graduates or those who withdrew: 300 yen per copy(2) Method of issuance

(1) Through automatic certificate issuing machines:
To use the machines which are installed at several locations in campuses, it is necessary to have your student identification card and your password for your Waseda-net Portal ID.

(2) Through application at a counter of the Center for Science and Engineering:
Fill in the specified Application for Certificate Issuance, affix stamps (you can buy them on a vending machine inside the Center) on the application form, and submit it with your student identification card to the Center staff.

Certificate types
★Certificate of Enrollment
★Academic Transcript
★Certificate of Expected Graduation
Certificate of Graduation
★Certificate of Academic Transcript and Expected Graduation (Japanese only)
Certificate of Academic Transcript and Graduation (Japanese only)
Certificate of Withdrawal

*Certificates with (★) can be issued by an automatic certificate-issuing machine.

(3) Student discount card ("*Gakuwari*")

You can get up to 10 student discount cards ("*Gakuwari*") issued per year from an automatic certificate-issuing machines.

8 Changes in the School Register

When there are any changes in your school registration status or in your guarantor's information, you must submit to the Center for Science and Engineering appropriate application forms and/or notices for such changes. The forms are available in the Center for Science and Engineering.

(1) Application for a leave of absence

(i) Requirements for a leave of absence
If you cannot attend classes (including examinations) for 2 consecutive months or longer because of illness or other legitimate reasons, you can take leave of absence by obtaining a permission from the dean of your School through the application procedures specified by the Faculty of Science and Engineering. Please first consult and ask your class academic advisor or supervisor to write their opinions on the form requesting for leave of absence and submit it to the Center for Science and Engineering by specified deadlines for the semester. Please note that leave of absence for taking an entrance examination of other universities is not permitted.

	Deadline to submit an application for leave of absence	End of leave of absence	Date of returning to school	Number of years of leave of absence
Fall semester	November 30	March 31 of the following year	April 1 of the following year	0.5 years
Spring semester	May 31	September 20	September 21	0.5 years

(ii) Period of leave of absence
Leave of absence is either leave of absence for the fall semester or leave of absence for the spring semester. If you have special circumstances, you may be allowed to take leave of absence for more than one semester by submitting application forms to the Center for Science and Engineering. The periods in which you take leave of absence are not counted into enrollment years. You cannot take leave of absence for more than 4 years in total.

(iii) Tuition and fees for the period of leave of absence
The tuition and fees to be paid during leave of absence will depend on the submission date of application forms. The payment details are as follows:

Fall semester	School expense	
If submitted from June 30 through October 31	Enrollment fee	50,000 yen
	Student Health Promotion Mutual Aid Association fee	1,500 yen
If submitted from November 1 through November 30	Tuition	Full amount for that semester
	Seminar fee	
	School expense	

Spring semester	School expense	
If submitted by April 30	Enrollment fee	50,000 yen
	Student Health Promotion Mutual Aid Association fee	1,500 yen
	Basic Education Enhancement fee	50,000 yen
If submitted from May 1 through May 31	Tuition	Full amount for that semester
	Seminar fee	
	Facility fee	

* If you take a leave of absence upon entering the university, tuition and fees are not reduced.

(2) Application for studying abroad

(i) If you are to be engaged in educational or research activities at overseas universities or higher educational institutions for 4 months or longer, your registration status can be changed to “studying abroad” status with permission from the dean of your school through application procedures specified by the Faculty of Science and Engineering. If you are not sure whether your case is treated as studying abroad or not, check with the Center for Science and Engineering in advance.

(ii) While you are enrolled in the school, you can study abroad for up to 1 year. You can study abroad for longer if you have special reasons.

(iii) The period of study abroad is not basically included in the number of enrollment years, except for TSA and ISA programs (see "15 Study Abroad" for details). However, one semester or one year of the studying abroad period can be included in the number of enrollment years of the School if what you studied abroad is judged by the University to be equivalent to completion of part of the programs in your School in light of the number of credits you earned at overseas universities, the period required for earning them and other conditions. For more details, contact the Center for Science and Engineering.

(iv) For more details about tuition and fees during the period of studying abroad, contact the Center for Science and Engineering. If you join an overseas study program of the Center for International Education, contact them.

(3) Application for returning to school

(i) If you want to get readmitted to the School after a leave of absence or studying abroad, you have to follow instructions and necessary documents which are sent to your guarantors at appropriate timing by the Center for Science and Engineering.

(ii) You are only allowed to return to the School at the beginning of a semester.

(4) Application for withdrawal

(i) If you want to withdraw from the university, apply at the Center for Science and Engineering for withdrawal with your student identification card.

(ii) If you withdraw from the university during a semester, you have to pay tuition and fees for that semester. For more details, contact the Center for Science and Engineering.

(5) Application for readmission

If you withdraw from the university for legitimate reasons and apply for re-admission within 7 years from the following academic year of your withdrawal, you may be re-admitted at the beginning of a school year. Detailed information on it for a given academic year becomes available around November the previous year. For more details, contact the Center for Science and Engineering.

(6) Notice of change of name, address, guarantor, etc.

(i) In case of any changes in your address, phone number or other personal information, immediately register the new information from the Profile screen of the Waseda-net portal. If your address is changed, obtain a new back side sticker for the student identification card in the Center for Science and Engineering after an e-mail message for approval has been sent to your Waseda-net e-mail address.

(ii) In case of any changes in addresses and/or phone numbers of your guarantor or payer of tuition & fees, immediately go through specified procedures in the Center for Science and Engineering.

(iii) In case of any change in your visa status, immediately submit a copy of your foreign registration card (both sides) to the Center for Science and Engineering.

(iv) A change of your given and/or family name must be reported with a copy of passport or other applicable relevant documents.

(v) In case of change of your guarantor for death or other reasons, a new guarantor must be reported immediately to the Center for Science and Engineering.

9 Scholarships

Regular students enrolled in the undergraduate and graduate schools can apply for scholarships at Waseda University. However, the following students are **NOT** eligible: Japanese Government Scholarship (Monbukagakusho) students, students supported by overseas governments, students receiving scholarships from scholarship organizations for their tuition, and non-degree research students. Depending on your resident (VISA) status, there are two ways to apply for scholarships (You can only register one of the following):

(i) For students with resident (VISA) statuses of "Permanent Resident", "Long-Term Resident/Teijusha", "Spouse/Child of Japanese Resident", or "Spouse/Child of Permanent Resident" and Japanese students

Foreign nationals with the above statuses can only apply for scholarships for Japanese students in the same way as Japanese students. Those who wish to apply for the scholarships need to fill out an application document attached to the Scholarship Information Guidebook, "CHALLENGE", which is sent together with other enrollment information, and submit it by the deadline. "CHALLENGE" is available at the Center for Science and Engineering from January through March, and should be submitted by the specified day in April. Please note that the above students cannot apply for the scholarships (**ii**) below (described in the "International Students' Handbook").

Scholarship information is available on the website of the Faculty of Science and Engineering and also posted on the Main gate bulletin board in Nishi-Waseda Campus.

(ii) For students with resident (VISA) statuses other than the statuses in i) above

Privately financed regular international students can apply for scholarships for international students. For more details, please refer to the "International Students' Handbook." Scholarship information is also posted on the bulletin board in the Lounge for International Student Community (1st floor of Building No. 61) and below the URL.

http://www.sci.waseda.ac.jp/english/office/scholarships.html

10 Rules on Use of Bulletin Boards

(1) Strictly observe the following rules in using standing signboards, notices and fliers in campuses:

(i) Required information
Clubs or student groups registered with the university: Specify the group name.
Clubs or student groups not registered with the university: Specify the group name and the department, academic year and name of the representative of the group.

(ii) False advertisements, invasions of privacy of other people and defamation are prohibited.

(iii) Notices against these rules may be removed without prior notification. Groups that violate these rules may no longer be permitted to use any standing signboards or give out notices or fliers.

(2) Standing signboards

As a rule, clubs or other student groups are not permitted to use standing signboards on the Nishi-Waseda Campus. However, they may be permitted to use standing signboards if it is judged that there is a justifiable reason.

(3) Notices

For details about bulletin boards, refer to the table on the next page. Observe the following rules in using bulletin boards. Notices against these rules will be removed.

(i) Apply to the Center for Science and Engineering (Academic and Student Affairs Section) for approval for use of the bulletin board.

(ii) Notices can be put on the bulletin boards for up to 3 weeks after approval is obtained.

(iii) Follow the notice size and number rules described below:

Bulletin board near the main gate: 55 cm long and 45 cm wide (size of a newspaper page) or smaller, 1 sheet

Bulletin board in buildings: 40 cm long and 27 cm wide (size of half a newspaper page) or smaller, Up to 2 sheets

(iv) Please use thumbtack when putting notices on bulletin boards. For bulletin boards on which thumbtacks cannot be used, use masking tape.

(v) Remove expired notices on your own.

(4) Distribution of fliers

Observe the following rules strictly in distributing fliers on campus:

(i) Distributing fliers for advertisement or for other commercial purposes (as a part-timer, etc.) is prohibited.

(ii) You are only allowed to distribute fliers by hand. Do not force people to accept fliers. Putting fliers on classroom desks, which gets in the way of conducting classes, is prohibited.

List of bulletin boards

Location	Bulletin board	Purpose
Main gate bulletin board	General information bulletin board	Information about notices posted on other bulletin boards Information about lecture meetings Event information Information about student societies' events, internship
	Admission bulletin board	Entrance examination information
	Student Support bulletin board	Scholarship (mainly for Japanese students)
		Event information, job search related information, notices from career center
	Class information bulletin board for	Undergraduate and graduate school calendars Information on Open Education Center, Teacher Training Program, MNC, etc. Course registration / grade announcement information Class cancellation information Reports, Examination information, Course Time tables, Classroom change
1st floor of Building No. 52	Bulletin board for the School of Fundamental Science and Engineering	Information of different departments
	Class schedule	Latest information about class schedules
	Classroom change	Classroom changes made after courses have started
	International Course	Information of different departments
1st floor of Building No. 53	Bulletin board for the School of Creative Science and Engineering	Information of different departments
1st floor of Building No. 54	Bulletin board for the School of Advanced Science and Engineering	Information of different departments
1st floor of Building No. 61 (within the Lounge for International Student Community)	International student support bulletin board & Career Info. bulletin board	Scholarship for international students and Information from ICC Career Information for Japanese and international students, Internship information for Japanese and international students
1st floor of Building No. 56	Laboratory work bulletin board	Information about Basic Experiments in Science and Engineering, Applied Physics Laboratory, etc.
2nd floor of Building No. 57	Bulletin board for clubs recognized by the Faculty of Science and Engineering	Space for announcement from clubs recognized by the Faculty of Science and Engineering
Student lounge of Building No. 51	Bulletin board for student societies only	Space for announcement from student societies
3rd floor of Building No. 50	Bulletin board for the office of Building No. 50	TWIns information, seminar room timetable, lecture information

11 Use of Classrooms and Common Seminar Rooms

To use classrooms for extracurricular activities, you have to submit an "Application for Use of Classrooms / Seminar Rooms" form available in the Center for Science and Engineering (Academic and Student Affairs Section). When submitting the form , keep the following in mind:

(1) Qualification to use classrooms

Only clubs recognized by the Faculty of Science and Engineering and equivalents and other groups headed, chaired or consulted by a full-time faculty member of the Faculty of Science and Engineering can use classrooms.

(2) Responsible person

The responsible person (full-time faculty member) must put his/her seal on the application for use.

(3) Submission of an application for use

An application for use must be submitted at least 3 business days before use.

(4) Available period

As a rule, use of classrooms is allowed except for the following periods:

Sundays, national holidays, Saturdays during holiday periods, period between the entrance ceremony and the start of classes, 2-week periods after the start of fall and spring semester classes, end of fall and spring semester examination periods, summer construction period, Rikoh-ten (exhibition for Science and Engineering Schools) periods, entrance examination periods during which campuses are closed, preparation periods for entrance examinations and periods during which classes are cancelled for other events

(5) Available time

As a rule, classrooms can be used between 18:00 and 20:00 on Monday through Friday, and between 14:40 and 20:00 on Saturday. During holiday periods, classrooms can be used between 9:00 and 17:30.

(6) Classrooms available

All classrooms located in Building No. 52, 53, 54, 56, 57, 58, 60, and 61, and common seminar rooms in Building No. 51, 60, 61, and 63 in Nishi-Waseda Campus.

(7) Available period

As a rule, a classroom can be used for up to 1 month. If you want to use a classroom for a longer period, submit an application for use again.

(8) Notes on using classrooms

(i) Using classrooms in a matter that interferes with classes, education, research or business of the university or undergraduate/graduate schools is not allowed.

(ii) Pay attention to the surrounding classrooms and do not disturb classes taking place in other classrooms.

(iii) Do not move tables, chairs, and other furniture in classrooms.

(iv) When using a classroom, please strictly observe the time period allowed.

(v) In case of an emergency that makes it necessary for the university to use the classrooms, you may be assigned to other rooms.

12 Extracurricular Activities

(1) International Community Center

The International Community Center (ICC) provides a meeting point for international students and Japanese students studying at Waseda University. It promotes mutual exchange between students beyond nationality and cultures. Throughout the year, the ICC organizes various sightseeing trips and events on campus. Please refer to the ICC website or visit the reception to confirm event information.

Contacts Information:

[Address] 1st floor, Bldg. No.7, Waseda campus
[Tel] 03- 5286 - 3990
[E-mail] icc@list.waseda.jp
[URL] http://www.waseda-icc.jp/
[Office hours]
During Semester: Weekdays: 11:00 - 19:00 Saturday: 10:00 - 18:00
During Semester Breaks: Weekdays: 9:00 - 17:00 Saturday: Closed

(2) Student Club Activities

Waseda students organize a wide variety of clubs, covering every interest and activity imaginable. Joining in club activities will be useful for you to establish bonds with Japanese students and to understand Japanese culture and social systems. You can visit the website (http://www.sci.waseda.ac.jp/english/office/studentclubs.html) for a list of clubs.

Also, reference books of student clubs are available at the Center for International Education. There are clubs and groups especially for international students. Please refer to the International Students' Handbook for details.

(3) The International Association for the Exchange of Students for Technical Experience (IAESTE)

The International Association for the Exchange of Students for Technical Experience (IAESTE) is an association established to support students' practical training in foreign companies or international exchange and to deepen mutual understanding and friendship between students around the world. This association was established in 1948, and Japan became a member of this association in 1964. Currently, the association has more than 100 member countries, and about 1000 universities of science and engineering and agriculture have participated in overseas student exchange programs of IAESTE International. It is sponsored by about 4,000 companies and has had more than 300,000 students in student exchange programs.

13 Safety Management

In the Nishi-Waseda Campus of Waseda University, more than 10,000 people including students, faculty and staff gather for education and research activities. As is often the case with a university of science and engineering, more than 4,000 fourth year students of undergraduate schools and graduate students are engaged in a variety of research activities. To prevent possible accidents during education and research activities and work on and improve other safety issues, the Nishi-Waseda Campus Safety and Health Committee of faculty and staff has been established. The committee has developed various safety management systems and supervises school-wide safety and health inspections and other safety management functions.

Students should observe the following rules:

- In laboratory classes, observe safety precautions explained during the Laboratory Work Guidance and work on experiments with safety in mind.
- As for the safety of experiments carried out as part of your graduation thesis, you have to listen to special precautions for your field of research. Follow the directions of supervisors and work on experiments safely.
- Participate actively in safety workshops held by laboratories and observe school rules, etc.

Use the Safety Guide and "Safety e-learning program" issued by the Nishi-Waseda Campus Safety and Health Committee, which describes the safety of experiments carried out as part of graduation and master's theses, and contact technical staff of relevant laboratories, etc. if you have questions (anzenrenraku@list.waseda.jp). The Safety Guide is available at the laboratories and the Technology Planning Section or can be checked from the following URL.

Nishi-Waseda Campus Safety Guide: http://www.tps.sci.waseda.ac.jp/

As a science and engineering school student, you must observe school rules as well as relevant laws and regulations, and always be aware of the safety of yourself and your surroundings and the safety and conservation of the global environment.

Response to emergencies

(1) Injury / serious illness

If you are injured seriously or become seriously ill, call the school emergency number (main gate security guard office: extension 3000). If you call 119 directly in an emergency (including in the event that the injured or ill persons should not be or cannot be moved), call the school emergency number too because an ambulance must be guided by security guard personnel. If the injured or ill persons can be moved, have him/her receive treatment in the Health support center (Nishi-Waseda branch at the 1st floor of Building No. 51, extension: 2640 / 2641) and have him/her get external medical help if needed. If the center is closed, call the school emergency number (extension 3000, external number: 03-5286-3022). On the Nishi-Waseda campus, there are four AEDs (for their locations, see http://www.waseda.jp/ecocampus/saf/activity/aednishiwaseda.html) available for use in emergency situations. If you are interested in learning how to perform CPR or use AED, you can take "普通救命講習"(First Aid Seminar)(offered 4 times a year). Details for the seminars will be posted on the Technology Planning Section website or Waseda-net Portal.

(2) Fire

Use a nearby fire extinguisher to initially extinguish the fire, and immediately call the school emergency number (main gate security guard office: extension:3000, external line: 03-5286-3022) to report the place and condition of the fire and receive instructions. If the fire cannot be extinguished with a fire extinguisher, escape to a safe place with those around you. Corridors of classroom buildings are equipped with emergency telephones (red boxes). You can use them to call extension 3000.

(3) Earthquake

Secure your safety under a desk or other shelter until the earthquake dies down. There are a number of chemicals and other potentially dangerous substances in the Nishi-Waseda Campus, so escape to the courtyard or another safe place. In case of a major earthquake, the university is supposed to set up disaster countermeasures offices in the headquarters and campuses to collect information and secure the safety of students, faculty and staff. Follow the instructions of the offices. Refer to the International Students' Handbook for more information.

14 Study Abroad

Students who are considering to study abroad should participate in the Study Abroad Fair held by the Center for International Education in April and October. This fair provides useful information for those who are considering study abroad, such as an overview and notes on studying abroad, how to obtain program information and how to use the Information Room of the university (3rd floor of Building No. 22 of the Waseda Campus). In particular, long-term overseas study requires more than 1 year of preparation. You should check the 1-year application procedure for overseas study and other detailed schedules, and other information in the Waseda-net portal and the website of the Center for International Education as needed.

When you study abroad through a university program, the expenses will depend on -each program and may vary from year to year depending on - circumstances of host universities. Scholarships for studying abroad include scholarships granted under the short-term overseas study promotion system of the Japan Student Services Organization, the Waseda University Student Exchange Scholarship, and the Scholarship for Exchange Program Scheme. The scholarship application bulletin and other documents are provided after your host university is confirmed-.

For more details about when you should study abroad, tuition and fees, whether credits earned in a foreign university are approved or not, and overseas study programs provided by the school, consult the -Academic and Student Affairs Section–of the Center for Science and Engineering.. For more details about overseas study programs for all students provided by the university or the application procedure, refer first to STUDY ABROAD --The Study Abroad Bulletin-- or other information prepared by the Center for International Education (http://www.waseda.jp/cie/index-j.html). Short-term programs in which people other than students of the university can also participate are provided by the Extension Center (http://www.ex-waseda.jp).

Study abroad programs for all students provided by the university are divided roughly into the types described below.

Program overview: long-term study abroad and short-term study abroad

(1) Long-term study abroad

(i) University-Wide Exchange Program (for undergraduate and graduate students)

This is a system that accepts foreign students from overseas partner universities and sends students of Waseda University to those universities. Students are given some freedom in selecting and taking courses.

Tuition and fees for this program are covered by the tuition and fees you pay for your undergraduate or graduate school in Waseda University with the exception of some universities. However, you may be required to pay a facility fee or other fees in that country. Generally, a university receives 1 to 3 students. Waseda University is allied with universities in various countries. To apply for participation in an English-based program, you must have taken TOEFL and obtained the score required by the university you are

applying to. For a non-English language-based program, you must have a good enough command of that language to follow classes in that language.

(ii) Thematic Studies Abroad (TSA) Program (for undergraduate students)

This program focuses on theme-based learning in building a curriculum. You can receive various kinds of support to improve your language ability and help your learning in that university. You are required to pay a set program fee and are exempted from tuition and fees for Waseda University. Generally, a relatively large number of students are accepted though the number of students accepted varies depending on the program. Countries and regions covered by this program are North America, England, Ireland, Oceania, China, and Europe.

(iii) Individualized Studies Abroad (ISA) Program (for undergraduate students and some graduate students)

As with the exchange program, students are given some freedom in selecting and taking courses from a regular curriculum in a local university in consultation with local coordinators. If your foreign language ability is not enough,, you may be required to study the language. You are required to pay a set program fee and are exempted from tuition and fees for Waseda University. Countries and regions covered by this program include North America, England, Ireland and Oceania.

(iv) Double Degree Program

If you study in a prestigious foreign university through this program and satisfy certain requirements, you can earn a degree from that university too when you graduate from Waseda University. You must have a high level of reading comprehension, listening and speaking ability of the language used in that country. Check partner universities of this program with the Center for International Education.

(2) Short-term study abroad (several weeks)

The Faculty of Science and Engineering, the Center for International Education and the Extension Center provide short-term study abroad programs during long school breaks. In the programs, you will learn the local language, culture and customs for a short period of time. Please contact each office for more information.

(3) Other study abroad programs

Studying abroad without receiving any scholarship, or at your own expense, including living expenses, by gaining entry to permission from a university or a language learning institution of your choice is called privately financed overseas study. For privately financed overseas study, you have to go through required procedures on your own or through an overseas study agency. Check how your registration status at Waseda University and tuition and fees are treated, which depends on your particular case, with the Office of the Faculty of Science and Engineering.

15 Nonsmoking Campus

The following rules on separation of smoking areas in Nishi-Waseda Campus have been established in accordance with the enforcement of the Health Promotion Law, which advocates the prevention of passive smoking (second-hand smoke), the notice regarding smoking issued by the Ministry of Education, Culture, Sports, Science and Technology, the ordinance regarding smoking on the street enacted by Shinjuku Ward, and the decision of the Executive Board on thorough separation of smoking areas. Observe these rules strictly. Also observe manners and rules on smoking on the street on the way to and from school. You should act with an awareness of being a student of Waseda University.

1. Smoking in public places is prohibited including classrooms, seminar rooms, laboratories, meeting rooms, lounges, foyers, atriums, libraries, students' reading rooms, CO-OP facilities, yards, corridors, stairs, passages, elevators, rest rooms and in open-air spaces, except for designated smoking areas.
2. Smoking is prohibited in laboratories and other places where seminars or student guidance is given, which are considered as classrooms.
3. Smoking while walking is prohibited.

16 Ban on Commuting by Bicycle, Motorcycle or Car

As a rule, students are prohibited from riding and parking a bicycle or driving a motorcycle or car into the Nishi-Waseda Campus. Since parking on streets around the campus is prohibited around the clock, commuting by bicycle, motorcycle, or car is prohibited. As to bicycles use only in special circumstances, you can inquire the General Affairs Section in the Center for Science and Engineering.

We have received many complaints from nearby residents about bicycles, motorcycles, and cars parked on the street in front of the main gate or in the walkways on the side of Meiji Dori and have been warned strictly by the local police stations repeatedly. This nuisance parking has caused traffic accidents. Be sure to observe these rules strictly. Do not think that you are an exception, but act with an awareness of being a student of Waseda University.

17 Library

Waseda University Library consists of 24 libraries and reading rooms. Graduate students can take out books from 15 libraries. You can find complete explanation about services on Library website :http://www.wul.waseda.ac.jp/index.html. Please check the newest information on that website as library system and services are improving day by day. Library materials can be searched through WINE: http://wine.wul.waseda.ac.jp/search/ or by mobile phones. By using the "View Your Records" function of WINE, you can check the status of your borrowed books or renew the due dates.

Waseda University Library has made a contract with many databases, such as online journals and e-books, not only actual materials (books, journals, newspapers, audio-visual materials, etc.). You can access these online materials through Waseda E-Resource Portal: http://www.wul.waseda.ac.jp/imas/index-e.html. When you want to use them from outside the university, please access via Off-Campus Access:

http://www.wul.waseda.ac.jp/imas/remote/index-e.html.

Nishi-Waseda Campus has the Science and Engineering Student's Reading Room and Science and Engineering Library. Notes on each feature and use are introduced as follows:

(1) Science and Engineering Student's Reading Room (Bldg. No.52, B1)

The Room is mainly for undergraduate students, providing Japanese books centered on science and engineering fields along with curriculum. It holds multiple copies for frequently used books.

(2) Science and Engineering Library (Bldg. No.51, B1)

This is a research library holding many journals and reference books both in Japanese and foreign languages in the field of science and engineering. Regarding what is available on-line, we introduce an online edition to the utmost extent for convenience. Textbooks of IPSE courses are located in the IPSE corner, and you can use them inside the library.

Notes on use

(i) Service hours during the semester

Mon. through Fri.: 9:00-21:00 Sat.:9:00-19:00

For summer, winter and spring vacations, please check service days and hours on the website.

(ii) Be sure to store your bags and personal belongings in a locker and lock it before entering the library. A 100 yen coin is required, but it will be returned after use.

(iii) Carry your student ID card at any time. If you forget it, you cannot use any library.

(iv) Smoking, chatting, eating and talking on mobile phones are prohibited inside the library.

(v) Please handle all library materials with care and be careful not to damage or get them wet. If you lose or damage library materials, you will be asked to compensate for them. Strict measures will be taken for malicious violations such as stealing library books, writing, underlining and marking library material, or cutting or tearing pages out of books.

(vi) When books are not returned by the due date, a penalty of 1 point per day per book will be applied. After reaching 50 points, you cannot check out books for 14 days. Reminder notice is sent 5 days before the due date via e-mail from the library.

(vii) Please keep the rule" User instructions for databases, electronic journals, etc. "

http://www.wul.waseda.ac.jp/db/db_notice-e.html

(viii) Some old journals or journals which available on-line are located at the Honjo Deposit Library in Saitama Prefecture. You can use online journals through WINE and the Waseda Portal for Online Journals: http://tm3xa4ur3u.search.serialssolutions.com/

You can order journals that are not available on-line.

(ix) When you have any question on how to use library, please search the library website first. Please use an on-line reference or ask at a counter if it is still not clear.

Waseda-net portal →system services →Library on-line request →Online References

18 Computer Rooms

Nishi-Waseda Campus-has about 700 computers which are mainly for -classes. These computers can also be used for preparing reports or for browsing Internet sites unless they are being used for a class.

3rd floor of Building No. 63

Name	Capacity	Use
Room A	80 people	Standard computer room (island type)
Room B	80 people	
Room C	100 people	
Room D	48 people	Standard computer room (classroom type)
Room E	48 people	
Room F	48 people	Computer room designed for foreign language class (classroom type)
Room G	48 people	
Room H	12 people	Computer room designed for group study (island type)

Others

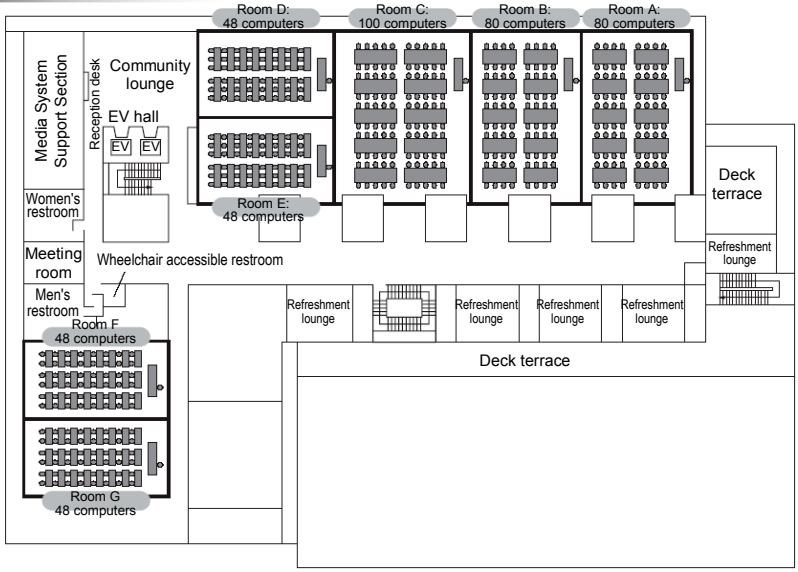
Name	Capacity	Location
Drafting/CAD room	208 people	1st floor of Building No. 57
-	-	-
-	-	-

The availability of computer rooms can be checked in the information panel and the website of the Media System Support Section. (⇒ http://www.mse.waseda.ac.jp/)

<Consultation service>

A help desk is located on the south side of the 3rd floor of Building No. 63, which provides a consultation service concerning school information accessibility and services.

Information floor map of 3rd floor of Building No. 63



○ Using Windows

Windows can be used in all the computer rooms. Word, Excel, PowerPoint, science and engineering software, and software development environments are available. To use Windows, you must enter your Waseda-net ID and password issued to youat admission procedures.

○ Using UNIX

A UNIX environment can be accessed from all the computer rooms. UNIX environments are mainly used in classes in programming languages, algorithms, and numerical analysis. To use a UNIX environment, you must apply for use through the Science and Engineering School Students website of the Waseda-net portal.

○ Using computers with foreign language learning equipment

Computers in Rooms F and G are equipped with a headset, with which you can use a foreign language learning support system (call system). These are mainly used in foreign language classes and in self-directed learning.

19 Experimental Facilities

(1) Common laboratories

Nishi-Waseda Campus has educational experiment facilities used for basic laboratory courses to be taken by first and second year students and for specialized laboratory courses provided by different departments. These facilities are shared among different departments and are called “common laboratories.” Educational experiments are mainly conducted in these laboratories, but facilities in these laboratories are also widely used for research activities.

○ Laboratories for basic experiments in science and engineering
Laboratories for basic experiments in science and engineering are used for Basic Experiments in Science and Engineering 1 and Basic Experiments in Science and Engineering 2 courses. Laboratories for basic experiments in science and engineering consist of 4 laboratories for different fields of academic study: laboratory for basic physical experiments, laboratory for basic chemical experiments, laboratory for basic bioscience experiments and laboratory for basic engineering experiments.

(Laboratory for basic physics experiments)
This laboratory is used for basic physics experiments of Basic Experiments in Science and Engineering Laboratory 1 course. You can learn the basics of physics through creative and unique experiments based on production.

(Laboratory for basic chemistry experiments)
This laboratory is used for basic chemistry experiments of Basic Experiments in Science and Engineering 1 and Basic Experiments in Science and Engineering Laboratory 2 courses. You can learn the basics of chemistry by shaking test tubes with your hands, and seeing and smelling them repeatedly.

(Laboratory for basic bioscience experiments)
This laboratory is used for basic bioscience experiments of Basic Experiments in Science and Engineering Laboratory 1 course. You can learn the basics of bioscience through observation of cells and extraction of DNA.

(Laboratory for basic engineering experiments)
This laboratory is used for basic engineering experiments of Basic Experiments in Science and Engineering Laboratoy 2 course. You can learn advanced and practical basic engineering technologies through operation of scanning electron microscopes and automatic computer measurement.

○ Materials laboratory
Strength tests or physical property tests of structural materials (metals, wood, concrete, etc.) and specialized experiments for evaluating the strength of structures are conducted.

○ Machining laboratory
This laboratory is used for machine shop practice using machines. You can receive guidance on machining and machine or experimentally produce laboratory equipment or parts.

○ Thermal engineering laboratory, fluid engineering laboratory and control engineering laboratory
Specialized experiments on thermal engineering, fluid engineering, or control engineering are conducted in these laboratories. In the fluid engineering laboratory, specialized experiments on hydraulics or water quality are also conducted.

○ Drafting/CAD room
In this room, which is equipped with about 400 drafters (drafting tables), laboratory training on the basics of drafting or computer-aided design and drafting exercises are conducted.

○ Survey practice room
Laboratory training on surveys using various types of surveying equipment is provided. This room is also used for photo survey-based reading of changes in the natural environment or measurement, archaeological research or other research.

○ Electrical engineering laboratory
Specialized experiments in the fields of electricity/electronics and information communications are conducted. Technical support on making measurements of voltage, current, or magnetic fields, or on building of circuits is also provided.

○ Chemical analysis laboratory
Specialized experiments in the fields of gravimetric analysis, volumetric analysis, instrumental analysis and other inorganic analytical chemistry are conducted. You can learn an extensive knowledge of analysis ranging from the basics of classic chemical analysis to instrumental analysis using large equipment.

○ Physical chemistry laboratory
Specialized experiments are conducted on chemical substances compounds or molecules that constitute them, based on physical methods.

○ Organic chemistry laboratory

Students learn the basics of conducting organic chemistry experiments from how to use reagents, equipments, and instruments to synthesis, separation and purification of organic compounds. Students deepen their understanding of organic chemistry by confirming what they have learned in lectures about reaction systems through experiments. They also acquire skills on experimental methods of organic chemistry by practicing and performing experiments repeatedly.

(2) Shared research facilities

In the shared research facilities, large equipment and precise measuring equipment that can be shared for research are intensively managed and used in a wide variety of research activities. Seminars and technical support on the use of equipment are also provided.

○ Materials Characterization Central Laboratory
The Materials Characterization Central Laboratory is a shared research facility used for analyzing the structure of materials. This laboratory is used by fourth year students assigned to a laboratory, master's degree students, doctoral degree students and researchers for research in a wide range of fields. The laboratory, which is equipped with state-of-the-

art measurement instruments for research, is also used by other universities and research institutions.

- Microtechnology Laboratory
  Semiconductor processing equipment and clean rooms are available as shared research facilities. This laboratory is used by researchers in a wide range of fields including mechanical engineering, solid-state physics, chemistry and material engineering.

- Media Design Laboratory
  Image information equipment for multimedia research or preparing teaching materials is available as shared research equipment. You can use a large color printer to prepare posters for conference presentations.

- Media Design Library
  The library has 20 AV booths where you can view and listen to foreign language teaching materials, etc. Each booth is equipped with a VHS deck, a DVD player, and an LD player. About 600 specialized teaching materials, about 300 foreign language teaching materials, and about 950 movies and documentaries are freely available. English Language Education materials are also available for freshmen and sophomores.

20 Health Support Center

Health Support Center

The Health Support Center was established to help students lay the groundwork for their health and acquire the ability to self-administer their mental and physical health so that they can lead a school life in good condition.
For more details, refer to the website below:
http://www.waseda.jp/kenkou/center/HSC/

Health Support Center on Nishi-Waseda Campus (1st floor of Building No. 51)

Open hours: Monday through Saturday 9:00 – 17:00
Tel: 03-5286-3021 < 03-5286-3082 (direct line for consultation) >

<Services>

(i) Annual health check-ups
(ii) Special health examinations
(iii) Issuance of various health certificates
*Only for those who have taken annual health check-ups

(iv) Health consultation
Monday through Friday 9:00 – 17:00

(v) Clinical examination by physician
Monday through Friday 13:30 – 15:40

(vi) First-aid treatment and care of sick persons
Monday through Saturday 9:00 – 17:00

(vii) Mental health consultation by psychiatrist (Room07, 1st floor of Building No.51)
3 times a week (*By appointment only) 13:00 – 17:00

Preventions of infectious diseases at school

If you contract any of the following infectious diseases, you are prohibited from attending school under Article 12 of the School Health Law to prevent infection -from spreading in campuses. The period of absence depends on the type of the infectious disease. For classes or examinations from which you were absent during your illness, -take the following procedure:

(1) Contact the Nishi-Waseda branch of the Health support center (Tel. 03-5286-3021) and the -Academic and Student Affairs Section of the Center for Science and Engineering.- (Tel. 03-5286-3002 / E-mail gakumu@sci.waseda.ac.jp) to report your disease.

(2) After you recover from the disease, request the Certificate of Recovery from Infectious Disease (CRID)* from your doctor.
* Certificate of Recovery from Infectious Disease （「学校伝染病治癒証明書」）:
http://www.waseda.jp/kenkou/center/HSC/contents/disease/disease.pdf#view=Fit&toolbar=0&statusbar=0&messages=0

(4) Submit the CRID and a notice of absence (available at the -Academic and Student Affairs Section of the Center for Science and Engineering-) to the instructors in charge of classes (examinations) from which you were absent and receive instructions from them.

(Types of infectious diseases to be prevented at school)

Class 1: Diseases that prevent infected students from attending school until recovery

Ebola virus hemorrhagic fever, Crimean-Congo hemorrhagic fever, severe acute respiratory syndrome (SARS corona virus), smallpox, South American hemorrhagic fever, plague, Marburg disease, Lassa fever, acute anterior poliomyelitis, and diphtheria, bird flu, swine flu, and other specified infectious diseases and newly emerged infectious diseases.

Class 2: Diseases that are transmitted ver. airborne droplets and are likely to spread in-campuses

Influenza (until 2 days after subsidence of fever), whooping cough (until –the characteristic coughing ceases), measles (until 3 days after subsidence of fever), epidemic parotiditis (until parotid swelling disappears), rubella (until the eruptions disappear), chicken pox (until all the eruptions get crusted), pharyngoconjunctival fever (until 2 days after main symptoms cease), and tuberculosis (until it is recognized that there is no threat of infection)

Class 3: Diseases that may spread in school if infected students attend school educational activities

Cholera, bacillary dysentery, enterohemorrhagic Escherichia coli infection, typhoid, paratyphoid, epidemic keratoconjunctivitis, acute hemorrhagic conjunctivitis, and other infectious diseases

* Source: Enforcement Ordinance of the School Health Safety Law

21 Transportation Strikes and Classes

(1) When employees of JR and other public transportation systems go on strike (general strike), whether classes will be held is determined as noted below.

(i) If the strike is called off by 12:00 am (midnight), classes will be given as usual.
(ii) If the strike is called off by 8:00 am, the third and subsequent period classes (classes after 1:00 pm) will be held.
(iii) If a decision to call off the strike is not made by 8:00 am, classes will be cancelled for the day.

Please note that these rules do not apply to work-to-rule strikes of JR and strikes of private railways.

(2) When employees of JR in the Tokyo metropolitan area go on partial strike (spot strike), classes are given as usual.

(3) When employees of JR in the Tokyo metropolitan area go on full strike for a limited number of hours, whether classes will be held is determined as noted below.

(i) If the strike ends by 8:00 am, the third and subsequent period classes (classes after 1:00 pm) will be held.

(ii) If the strike ends by noon, the sixth and subsequent period classes (classes after 6:00 pm) will be held.

(iii) If the strike does not end by noon, all classes for that day will be cancelled.

(4) If only private railway and urban transportation goes on strike, classes will be held as usual.

(5) Whether classes provided by the School of Human Sciences and the School of Sport Sciences are held is determined by rules (1), (2), and (3) given above, but instead of rule (4) above the following rule applies.

(i) When either or both of the Shinjuku line and the Ikebukuro line of Seibu Railway go on strike or

(ii) When these lines do not go on strike, but Seibu Bus goes on strike whether classes will be held is determined as noted below.

A. If the strike ends by 8:00 am, the third and subsequent period classes (classes after 1:00 pm) will be held.

B. If the strike does not end 8:00 am, all classes for that day will be cancelled.

22 Contingency Measures Due to Severe Weather

Any decision to cancel classes, postpone examinations, and enact other contingency measures due to severe weather shall be the responsibility of the University and shall not be based solely on warnings and advisories issued by the Japan Meteorological Agency.

When weather conditions are severe (heavy rainfall, flooding, high winds, blizzard conditions, heavy snow, etc.) or when a warning has been issued by the Japan Meteorological Agency and a determination has been made by the University that current conditions pose a danger to the safety of students and employees, the University will enact contingency measures such as the cancellation of classes, postponement of examinations, etc. Directives enacting such contingency measures on any campus (or campuses) shall apply to all courses and examinations taking place on the designated campus (or campuses).

1. Based on prevalent weather conditions such as during a typhoon, heavy snow, etc. where forecasts with reasonable accuracy can be made, and the University deems that conditions pose a danger to the safety of students and employees, the University will issue an emergency bulletin a day in advance to cancel classes, postpone examinations, etc. In such cases, a decision will be made by no later than 7 pm and a notification posted for students through the University's website and other communication channels by 9 pm on the day prior to the day in question.

2. In all other circumstances which do not fall under Item 1 above, any directive to cancel classes, postpone examinations, etc. will be issued no less than 60 minutes before the start of each affected class period and examination. Notifications will be posted on the University's website, as well as being disseminated via other communication channels.

Emergency Communication Channels

1. Waseda University Website:
   http://www.waseda.jp/
2. Waseda University Emergency Bulletin Website for Mobile Phones (also PC-compatible):
   http://m.waseda.jp/
3. Waseda University Emergency Bulletin Website (Yahoo! Japan Blog) (Mobile phone-compatible):
   http://blogs.yahoo.co.jp/waseda_public
4. Waseda-net portal Login Page (PC only):
   https://www.wnp.waseda.jp/

Special Exemptions to the Cancellation of Classes and Examination Postponement

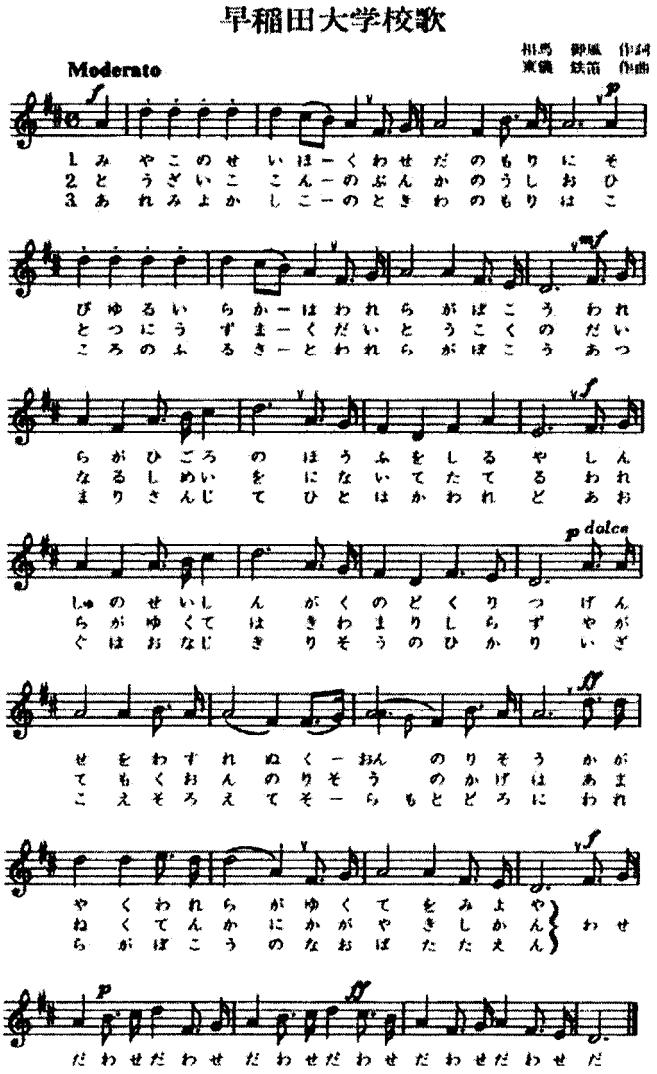
1. On-Demand courses:
   Directives to cancel classes do not apply.
2. Distance Learning System classes which take place simultaneously on multiple campuses:
   Any Distance Learning System classes taking place on multiple campuses (Waseda, Nishi-Waseda, Honjo) and which are directly impacted by the cancellation of classes at any of the campuses will be cancelled on a university wide-basis.

In general, during severe and dangerous weather conditions, the University will issue a directive to cancel classes, postpone examinations, etc. All affected students are expected to keep themselves informed and heed such directives. Students are advised to delay their commute or to refrain from coming to the University when their commuting routes (to the campus where their respective classes are taking place) are under any severe weather warnings issued by the Meteorological Agency, and they feel that commuting will endanger their safety. In such cases, the student should process a completed Report of Absence Form (*Kesseki-todoke*) with his/her affiliated graduate school, and ask the course instructor in question for due consideration regarding his/her absence.

V

Appendix

1 Alma Mater



一.
都の西北 早稲田の森に
聳ゆる党は われらが母校
われらが日ごろの抱負を知るや
進取の精神 学の独立
現世を忘れぬ 久遠の理想
かがやくわれらが行手を見よや
わせだ わせだ わせだ
わせだ わせだ わせだ

二.
東西古今の文化のうしほ
一つに渦巻く 大島国の
大なる使命を 担ひて立てる
われらが行手は 窮り知らず
やがても久遠の 理想の影は
あまねく天下に 輝き布かん
わせだ わせだ わせだ
わせだ わせだ わせだ

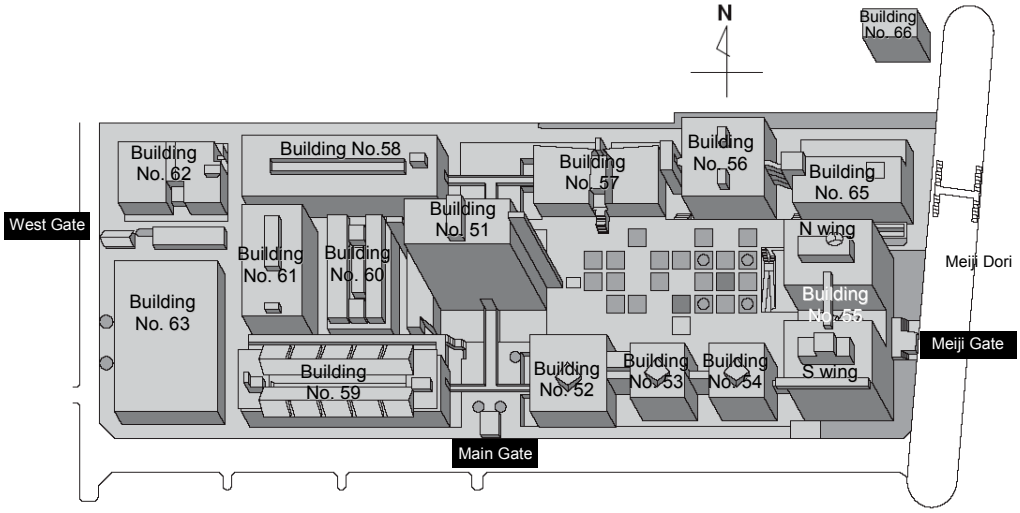
三.
あれ見よかしこの常盤の森は
心のふるさと われらが母校
集まり散じて 人は変れど
仰ぐは同じき 理想の光
いざ声そろへて 空もとどろに
われらが母校の名をばたたへん
わせだ わせだ わせだ
わせだ わせだ わせだ

2 URLs and Telephone Numbers at a Glance

If cannot find an answer to your question in the bulletin or website, contact the following:

Course	Contact	Telephone number	URL and E-mail address
Course registration Examinations & Grades Certificates Tuition and fees Scholarships School register (study abroad, leave of absence, withdrawal and re-admission) VISA Student clubs and activities	Office of the Faculty of Science and Engineering (Academic and Student Affairs Section)	03-5286-3002	gakumu@sci.waseda.ac.jp
Entrance examinations Transferring to another department Details about research of faculty members	Office of the Faculty of Science and Engineering (Admissions Office)	03-5286-3003	gyoumu@sci.waseda.ac.jp
Notices on campus Bicycle parking Management and reservation of meeting rooms TA Various research subsidy programs	Office of the Faculty of Science and Engineering (General Affairs Section)	03-5286-3000	
Waseda-net Personal computers	Media System Support Section	03-5286-3049	helpdesk@mse.waseda.ac.jp
Disposal of electronic equipment	Technology Planning Section	03-5286-3500	http://www.tps.sci.waseda.ac.jp/
Injury and sickness	Nishi-Waseda branch of the Health support center	03-5286-3021	http://www.waseda.jp/kenkou/center/HSC/
Libraries	Science and Engineering Library	03-5286-3084	riko-tosho@list.waseda.jp
CO-OP	CO-OP of Waseda University	03-3200-4206	info@wcoop.ne.jp
Advice on immigration formalities	Center for International Education	03-3207-1454	cie@list.waseda.jp http://www.waseda.jp/cie/index-e.html
Extracurricular activities and event for international students	International Community Center	03-5286-3990	icc@list.waseda.jp http://www.waseda-icc.jp/
Career consultation	Career Center	03- 3203- 4332	career@list.waseda.jp http://www.waseda.jp/career/

3 Campus Map

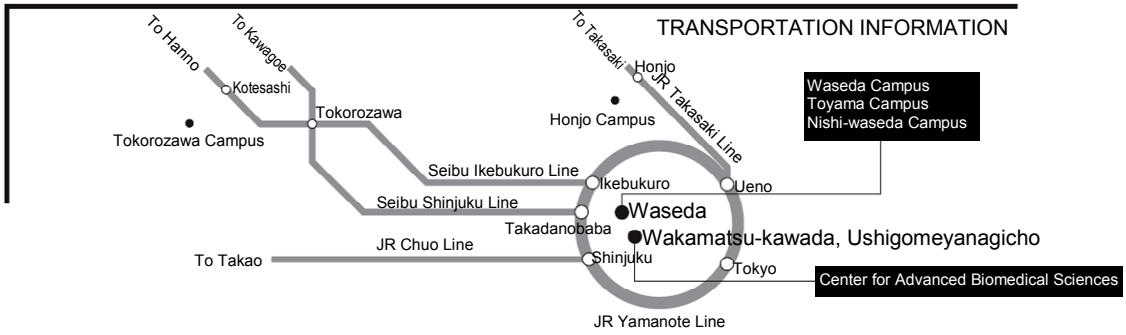


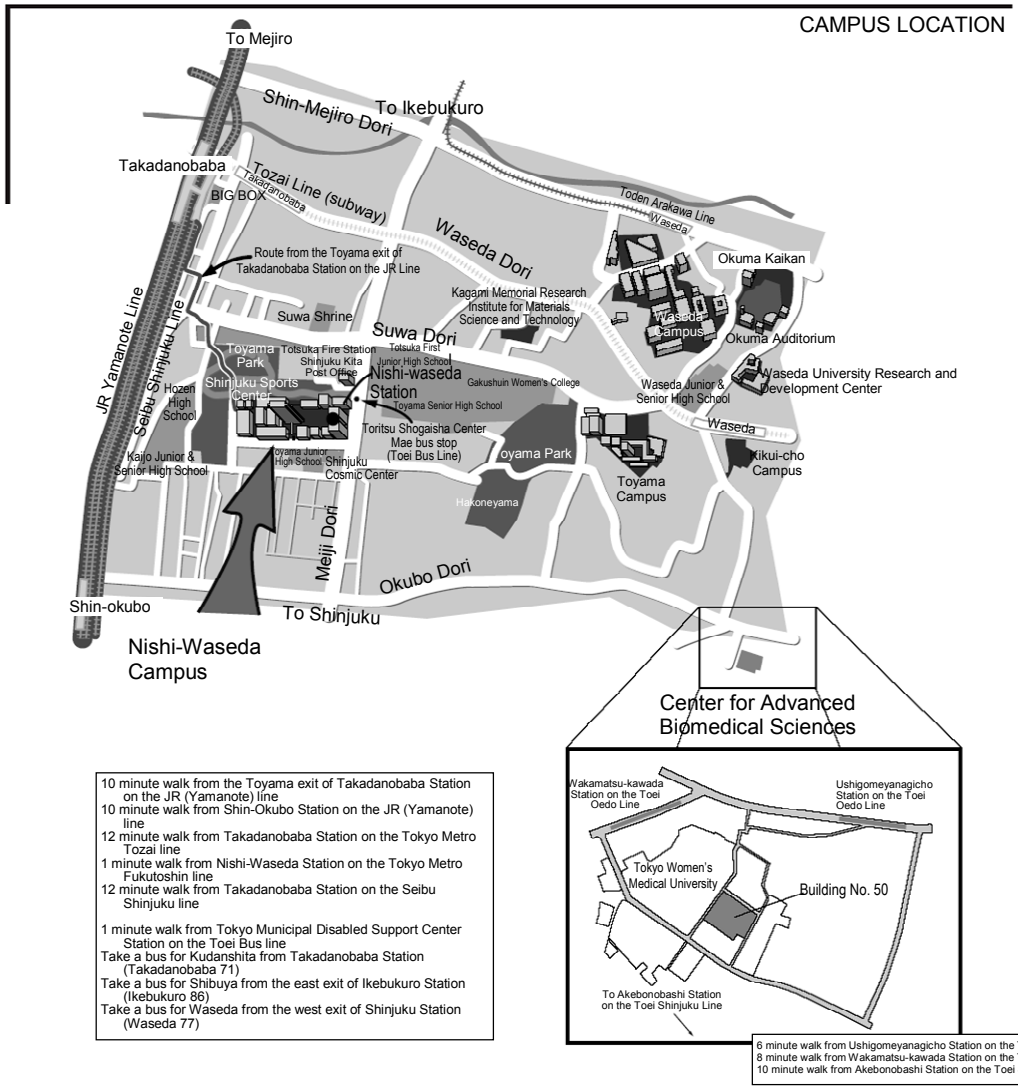
Media System Support Section Help Desk 3rd floor of Building No. 63	Media Design Library 3rd floor of Building No.61	Laboratory for basic experiments in science and engineering (Chemistry, Bioscience) Building No. 56	Office of the Faculty of Science and Engineering 1st floor of Building No. 51
Computer Rooms A to G 452 personal computers 3rd floor of Building No. 63	Lounge for International Student Community & Career Info. 1st floor of Building No. 61	Laboratory for basic experiments in science and engineering (Physics) 2nd floor of Building No. 56	Health support center Nishi-Waseda branch 1st floor of Building No. 51
Rikoh Restaurant 1st floor of Building No. 63		Rikoh Cafeteria basement 1st floor of Building No. 56	Student Counseling Room 1st floor of Building No. 51
Laboratory for basic experiments in science and engineering (Engineering) 1st basement of Building No. 63	Drafting/CAD Room 208 personal computers 1st floor of Building No. 57	Students' Reading Room basement 1st floor of Building No. 52 and 53	Student Lounge 2nd floor of Building No. 51
	CO-OP school store and book store 1st basement of Building No. 57		Science and Engineering Library basement 1st floor of Building No. 51

List of the offices of departments

Fundamental Science and Engineering	Creative Science and Engineering	Advanced Science and Engineering
Department of Pure and Applied Mathematics Room 01, 1st floor of Building No. 63	Department of Architecture Room 03, 2nd floor of N wing of Building No. 55	Department of Pure and Applied Physics Room 03, 2nd floor of N wing of Building No. 55
Department of Computer Science and Engineering Room 01, 1st floor of Building No. 63	Department of Modern Mechanical Engineering Room 08, 2nd floor of Building No. 60	Department of Chemistry and Biochemistry Room 03, 2nd floor of N wing of Building No. 55
Department of Applied Mechanics Room 08, 2nd floor of Building No. 60	Department of Industrial Management and Systems Engineering Room 00, 13th floor of Building No. 51	Department of Applied Chemistry Room 03, 2nd floor of N wing of Building No. 55
Department of Electronic and Photonic Systems Room 01, 1st floor of Building No. 63	Department of Civil and Environmental Engineering Room 07B, 17th floor of Building No. 51	Department of Life Science and Medical Bioscience 3rd floor of Building No. 50 Office of the Center for Advanced Biomedical Sciences 2-2, Wakamatsu-cho, Shinjuku-ku, 163
Department of Intermedia Art and Science Room 01, 1st floor of Building No. 63	Department of Earth Resources and Environmental Engineering 13th floor of Building No. 51	Department of Electrical Engineering and Bioscience Room 03, 2nd floor of N wing of Building No. 55
	Division of Intellectual Assets and Socio-Industrial Policies Room 00, 4th floor of Building No. 51	Department of Integrative Bioscience and Biomedical Engineering Room 03, 2nd floor of N wing of Building No. 55
		Department of Nanoscience and Nanoengineering Room 01, 1st floor of Building No. 63
		Joint Department of Advanced Biomedical Sciences (Center for Advanced Biomedical Sciences) 3rd floor of Building No.50
Center for English Language Education in Science and Engineering Room 00, 4th floor of Building No. 51		Joint Department of Advanced Health Science (Center for Advanced Biomedical Sciences) 3rd floor of Building No.50
International Center for Science and Engineering Room 01, 1st floor of Building No. 63		Joint Department of Nuclear Energy (Center for Advanced Biomedical Sciences) 1st floor of Building No.63

NISHI-WASEDA CAMPUS





10 minute walk from the Toyama exit of Takadanobaba Station on the JR (Yamanote) line
10 minute walk from Shin-Okubo Station on the JR (Yamanote) line
12 minute walk from Takadanobaba Station on the Tokyo Metro Tozai line
1 minute walk from Nishi-Waseda Station on the Tokyo Metro Fukutoshin line
12 minute walk from Takadanobaba Station on the Seibu Shinjuku line

1 minute walk from Tokyo Municipal Disabled Support Center Station on the Toei Bus line
Take a bus for Kudanshita from Takadanobaba Station (Takadanobaba 71)
Take a bus for Shibuya from the east exit of Ikebukuro Station (Ikebukuro 86)
Take a bus for Waseda from the west exit of Shinjuku Station (Waseda 77)

6 minute walk from Ushigomeyanagicho Station on the Toei Oedo Line
8 minute walk from Wakamatsu-kawada Station on the Toei Oedo Line
10 minute walk from Akebonobashi Station on the Toei Shinjuku Line

Faculty of Science and Engineering, Waseda University
3-4-1, Okubo, Shinjuku-ku, Tokyo, 169-8555
http://www.sci.waseda.ac.jp/
info@sci.waseda.ac.jp

Cover designed by: Ken Yabuno