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STUDENT HANDBOOK

学 生 便 覧

2021

令和3年度



Graduate School of Science and Technology

大学院自然科学研究科

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I Graduate School of Science and Technology Overview

自然科学研究科の概要

Graduate School of Science and Technology Overview

The Graduate School of Science and Technology (GSST) at Niigata University (NU) was newly founded in 1995 as an independent graduate school consisting of nine master's departments and five doctoral departments. It was established by merging the pre-existing Graduate Schools of Science, Engineering, and Agriculture. GSST places special emphasis on completing postgraduate education over an uninterrupted five-year period. It has continually sought to cultivate highly creative individuals with broad perspectives in addition to advanced and highly-specialized research capabilities through interdisciplinary collaboration of faculty members, thereby providing education and research supervision without being bound by conventional academic fields. Later in 2004, when national universities were transformed into national university corporations, GSST was restructured into six master's departments and five doctoral departments. This further enabled education and research at the graduate school to contribute to society and fulfill its role in human resource development. The purposes of this restructuring were firstly, to integrate the specialized graduate education with the basic education which had been systematically developed by the undergraduate faculties of science, engineering, and agriculture; secondly, to provide the specialized knowledge necessary in conducting research activities at the graduate school; and finally, to facilitate the acquisition of broad scientific knowledge required for students to work as researchers and engineers.

In a report issued by the Central Council for Education in September, 2005, the enhancement of educational functions in order to substantialize graduate school education was proposed, i.e., to strengthen the systematic development of curricula and, within Doctoral Programs in particular, enable attractive education through extensive contact with advanced academic research. At NU, approximately 60% of undergraduate students studying natural sciences advance to graduate school; hence, the increased need to systematically reinforce graduate school education by strengthening the level of cooperation between the undergraduate and graduate educational programs more than ever before.

Against this background, the graduate school in 2010 was reorganized into five master's and five doctoral departments in order to further substantialize and upgrade the education it provides by enhancing and strengthening its newly developed educational programs. In addition, degree programs were restructured so that student could advance seamlessly from undergraduate to master's and doctoral degree programs. At the same time, "Courses" were instituted as educational programs to replace "*Daikoza*" by placing importance on the students' standpoints and learning perspectives. Through this reorganization, GSST aims to cultivate individuals with high expertise who can respond to advancements within their specialization and interdisciplinary fields by further developing traditionally successful interdisciplinary-oriented education and research that integrate the fields of science, engineering, and agriculture.

- GSST Principles
 - The graduate school, which is an independent, comprehensive graduate school that is segmented into the initial two-year-long *hakase zenki* (master's) programs and the subsequent three-year-long *hakase koki* (doctoral) programs, places special emphasis on completing postgraduate education over an uninterrupted five-year period.
 - The graduate school aims to cultivate highly creative individuals with broad perspectives in addition to advanced and highly-specialized research capabilities through faculty members from differing fields who cooperate together in providing education and research supervision without being bound by conventional academic fields.
 - The graduate school cultivates not only university faculty members and researchers but also advanced professionals with the ability to actively solve problems in their respective fields in a way that flexibly responds to developments in academics and culture as well as in science and technology.
 - The graduate school conducts educational activities and research that flexibly respond to diverse academic and social demands.

Niigata University Graduate School of Science and Technology
Diploma Policy

The Graduate School of Science and Technology (GSST) cultivates highly creative individuals with broad perspectives in addition to advanced expertise and research capabilities. To receive accreditation of program completion students must satisfy the following requirements to enable them to actively solve problems in their respective fields in a way that flexibly responds to developments in academics and culture as well as in science and technology.

1. Master's Programs

○Fundamental Sciences

Students must understand the properties of substances, the mechanisms of nature, and the basics of mathematical phenomena, and they must also acquire the abilities to conduct a variety of experiments, perform theoretical calculations, and utilize mathematical analytical methods. Students must be excellent human resources who play active roles in the society, and they must also possess research capabilities that leverage insight and originality obtained through experience at the forefront of research.

○Advanced Materials Science and Technology

Students must possess fundamental expertise relating to upgrading equipment and improving functionality, optimizing product design and production processes, as well as designing and developing new and functional materials in order to contribute to the continuous development of humanity, including global environment preservation, resource circulation, and health maintenance and promotion. In addition, students must possess the ability to flexibly and broadly apply these areas of expertise. They must also possess a rich sense of humanity, high-level communication abilities, and the ability to contribute to the continuous development of society.

○Electrical and Information Engineering

Students must be highly specialized in the field of electrical and information engineering and possess advanced application skills. They must also possess broad perspectives, rich sense of humanity and ethics, as well as excellent communication skills. Students must possess the ability to contribute to the creation of a cultured society with safety, security and health.

○Life and Food Sciences

Students must possess a fundamental understanding of life phenomena and the ability to engage in broad interdisciplinary areas as pioneers in developing new technologies and improving regional agriculture, food and related industries, as well as the environment and social economy. This is based on an awareness of the modern trend of genome to post-genome life sciences and the increasing strain placed on medium-to-long-term food resources under globalization.

○Environmental Science and Technology

Students must possess the ability to create urban and rural habitats from the natural environment, in a highly original way, through experiences in leading-edge research by exploring the environments and structures of broad areas. In addition, they must understand the interrelation that human society has with the geosphere,

hydrosphere, and biosphere from a global perspective.

2. Doctoral Programs

○Fundamental Sciences

Students must possess highly original research capabilities as well as deep expertise, technical skills, and broad insight enabling them to actively engage with various issues encountered in mathematical scientific phenomena within the fields of mathematics, physics, and chemistry. This will enhance the elucidation of the mechanisms behind the properties and reactions of substances and exploring new materials.

○Advanced Materials Science and Technology

Students must possess fundamental expertise based on deeper understanding, relating to upgrading equipment and improving functionality, optimizing product design and production processes, as well as designing and developing new and functional materials in order to contribute to the continuous development of humanity, including global environment preservation, resource circulation, and health maintenance and promotion. They must also possess an advanced ability to flexibly and broadly apply these areas of expertise. In addition, students must possess a rich sense of humanity, high-level communication skills, and a comprehensive, advanced ability to contribute to the continuous development of the society.

○Electrical and Information Engineering

Students must possess the ability to analyze and theoretically elucidate complex and diverse phenomena from the perspective of electrical and information engineering. In addition, students must also possess the ability to contribute to the creation of a safe, secure, healthy, and cultural society by creating and developing original technologies.

○Life and Food Sciences

Students must possess the ability to creatively engage as pioneers in broad interdisciplinary areas by acquiring fundamental understanding of life phenomena, pursuing advanced expertise in developing new technologies, and improving regional agriculture, food and related industries, as well as the environment and social economy. This is in order to not only elucidate the fundamental principles of life but also life phenomena from the molecular level up to individual organisms. In addition, growing social issues such as food security and changes in the global environment can be further solved through a broad range application of acquired knowledge.

○Environmental Science and Technology

Students must possess a highly original ability to create urban and rural habitats from the natural environment by exploring the structures of broad areas from the global scale down to Niigata, a region with snowy winter and warm summer in north-eastern Asia facing the Sea of Japan, where Niigata University is located. This is achieved by understanding the interrelation that human society has with the geosphere, hydrosphere, and biosphere from a global perspective.

Niigata University Graduate School of Science and Technology
Regulations

April 1, 2004
GSSTR Ver. 1

(Purpose)

Article 1. In addition to matters stipulated in the Niigata University Graduate School Regulations (2004 Niigata University Graduate School Regulations Ver. 1; hereinafter the “NU Graduate School Regulations”), these regulations stipulate necessary matters relating to educational methods, student registration methods, completion requirements, etc. at the Graduate School of Science and Technology of Niigata University (hereinafter the “Graduate School”).

(Programs)

Article 2. The Graduate School programs are deemed as postgraduate doctoral, or *hakase*, courses segmented into initial two-year doctoral, or *hakase zenki*, programs (hereinafter “Master’s Programs”) and latter three-year doctoral, or *hakase koki*, programs (hereinafter “Doctoral Programs”). The *hakase zenki* programs shall be treated as master’s courses.

(Departments and courses)

Article 3. Departments and Courses in the Graduate School are as shown in Appended Table 1.

(Purposes of education and research)

Article 3-2. As a segmented graduate school that integrates the fields of science, engineering, and agriculture, the Graduate School places importance on completing education over an uninterrupted five-year period and aims to cultivate highly creative individuals with broad perspectives and excellent research capabilities.

2. As educational objectives, Master’s Programs aim to cultivate individuals who possess the following abilities by requiring students to acquire expert knowledge in specialized fields and a fundamental grounding in related fields through education and research in each department.

(1) The ability to make ethical judgements regarding nature, society, and humanity

(2) The ability to understand and apply fundamental theories and technologies

(3) The ability to discover and solve problems

(4) The ability to communicate effectively, including academic conference presentations

(5) The ability to report within a specified period of time

3. Each master’s department shall conduct the following educational activities and research in order to achieve the aforementioned educational objectives.

(1) Fundamental Sciences is composed of mathematics, physics, and chemistry-related fields. It shall conduct educational activities and research concerning the elucidation of the fundamental laws of nature, space, and substance properties and reaction mechanisms; the creation of new materials and substances; and the exploration of mathematical scientific phenomena.

(2) Advanced Materials Science and Technology is composed of materials, chemistry, mechanics, and social system engineering-related fields. It shall conduct educational activities and research relating to advanced materials creation; materials development and assessment that have new functions or high functionality; and mechanical science and engineering for production processes and materials production.

(3) Electrical and Information Engineering, which contributes to the creation of an advanced information, energy-conserving, and welfare society, is composed of the fields of information engineering, electrical and electronic engineering, and human sciences and assistive technology. It shall conduct educational activities and research relating to telecommunication networks, intelligence information sciences, highly-efficient energy, electronic devices, nanotechnology, sensing, medical bioengineering, and welfare engineering.

(4) Life and Food Sciences is composed of the fields of basic life sciences, applied life and food sciences, and agriculture and bioresource sciences. It shall conduct educational activities and research relating to biology and its fundamentals, which elucidate the principles of life, as well as broader fields of applied sciences concerning agriculture and other related disciplines.

- (5) Environmental Science and Technology is composed of fields that organically integrate specialized domains such as science, engineering, agriculture, etc. It shall conduct educational activities and research relating to environmental sciences from a comprehensive perspective that goes beyond the pre-existing framework of academic fields by tackling global-scale environmental problems as well as those faced by local communities via multifaceted approaches.
4. As educational objectives, Doctoral Programs aim to cultivate individuals who possess the following abilities by requiring students to acquire the capability to conduct comprehensive and interdisciplinary analyses that incorporate the findings and perspectives of related fields. This is achieved through leading-edge educational activities and research in each department based on the premise that students possess mastery of a specialized field.
 - (1) The ability to recognize one's responsibilities with a broad perspective toward nature, society, and humanity
 - (2) The ability to define and solve problems
 - (3) The ability to communicate effectively
 - (4) The ability to give presentations at international conferences, etc.
 - (5) The ability to write papers for academic journals
5. Each doctoral department shall conduct the following educational activities and research in order to achieve the aforementioned educational objectives.
 - (1) Fundamental Sciences shall conduct leading-edge educational activities and research concerning the elucidation of the fundamental laws of nature, space, and substance properties and reaction mechanisms; the creation of new materials and substances; and the exploration of mathematical scientific phenomena.
 - (2) Advanced Materials Science and Technology shall conduct leading-edge educational activities and research relating to creating new materials by controlling the structures of atoms and molecules, compounding different materials through interfacial control, and chemically developing functional materials. In addition, it shall carry out advanced educational activities and research concerning materials assessments, production machine systems, materials control, production processes in harmony with the environment, etc.
 - (3) Electrical and Information Engineering shall conduct leading-edge educational activities and research relating to telecommunication networks, intelligence information sciences, highly-efficient energy, electronic devices, nanotechnology, sensing, medical bioengineering, and welfare engineering.
 - (4) Life and Food Sciences shall conduct leading-edge educational activities and research to build sustainable agricultural production in harmony with the environment; explore and apply the principles of life through organic cooperation between fundamental and applied academic fields; construct applied academic fields aimed at solving food problems; and develop agriculture-related industries while working from a broad range of research fields to elucidate the principles of life phenomena from the molecular level up to individual organisms.
 - (5) Environmental Science and Technology shall conduct leading-edge educational activities and research relating to environmental sciences from an interdisciplinary perspective that goes beyond the pre-existing framework of academic fields by tackling global-scale environmental problems as well as those faced by local communities via multifaceted approaches.

(Selection examinations)

Article 4. Selection of individuals wishing to enroll in the Graduate School shall be determined via selection examinations.

2. Necessary matters relating to screening examinations and selection methods shall be stipulated separately.

(Advancement)

Article 5. Pursuant to Article 43 of the NU Graduate School Regulations, students wishing to advance into a Doctoral Program shall be permitted to advance once selected.

(Educational methodology)

Article 6. Education at the Graduate School shall be provided through class subjects and supervision relating to dissertation writing, etc. (hereinafter “research supervision”).

2. Class subjects shall be categorized into courses common across the departments and department-specific courses for each degree level.

(Special provisions relating to educational methodology)

Article 7. If the faculty council deems it especially necessary for educational purposes, it shall be possible to provide classes and research supervision in the evening or during some other specified time or period.

2. Necessary matters relating to educational methodology shall be stipulated separately.

(Long-term completion of curricula)

Article 8. If a student wishes to complete a curriculum over an extended period of time pursuant to Article 31 of the NU Graduate School Regulations, the long-term completion shall be permitted following deliberation by the faculty council.

2. Necessary matters relating to long-term completion of curricula shall be stipulated separately.

(Class subjects, numbers of credits, and method of completion)

Article 9. Class subjects and numbers of credits for Master’s and Doctoral Programs are as shown in Appended Table 2 and Appended Table 3 (English version not available in this handbook).

2. Regarding the class subjects mentioned in the preceding paragraph, students in Master’s Programs must earn either at least 38 or 42 credits according to the standard credit requirements for the department concerned, as shown in Appended Table 4 (English version not available in this handbook).

3. Regarding the class subjects mentioned in Paragraph 1, students in Doctoral Programs must earn either at least 19 or 23 credits according to the standard credit requirements for the department concerned, as shown in Appended Table 5 (English version not available in this handbook).

4. Necessary matters relating to method of completion other than those stipulated in the preceding two paragraphs shall be stipulated separately.

(Credit calculation method)

Article 10. Credits for class subjects at the Graduate School shall be calculated in accordance with the following standards.

(1) Lectures and seminars are worth one credit for every 15 hours of class.

(2) Laboratory work and workshops are worth one credit for every 30 hours of class.

(Credit calculation standard for class subjects implemented via multiple formats)

Article 10-2. Credits for class subjects implemented using two or more formats (lectures, seminars, laboratory work, or workshops) shall be calculated in accordance with the standards provided in the preceding Article based on the specific combination.

(Academic supervisors)

Article 11. Students shall be assigned a main supervisor and a number of sub-supervisors who are in charge of providing research supervision.

2. The main supervisor shall be the professor from the course to which the student belongs. However, if deemed necessary by the faculty council in Master’s Programs, this role shall be filled by a professor, associate professor, lecturer, assistant professor, or visiting professor of the department to which the student belongs. In Doctoral Programs, the role shall be filled by a professor, associate professor, or visiting professor of the department to which the student belongs.

3. Students shall be assigned two sub-supervisors. In Master’s Programs, this role shall be filled by a professor, associate professor, lecturer, assistant professor, visiting professor, or visiting associate professor of Master’s Programs. In Doctoral Programs, the role shall be filled by a professor, associate professor, visiting professor, or visiting associate professor of the Doctoral Programs.

(Research supervising committee)

Article 12. Research supervising committees (hereinafter “supervising committees”) shall be established to provide students with supervision relating to research and course completion.

2. Supervising committees shall be made up of the main supervisor and sub-supervisors for each student.
(Study plan and research plan)
- Article 13. Students must decide research topics and class subjects to take under the supervision of his/her supervising committee within the first month following enrollment (including advancement from a lower degree level).
 2. As a general rule, at the beginning of each program year, students must determine which class subjects to take that year and submit the designated registration notification to the dean.
 3. At the beginning of every program year, supervising committees shall have sufficient discussion with students regarding their research supervising plan for the year, and offer research supervision upon specifying the plan clearly regarding the designated research supervising plan form.
(Recognition of class subject completion and conferral of credits)
- Article 14. Class subject completion shall be determined via research report or written or oral examination. Passing students who are also deemed to have sufficient attendance for the class subject concerned shall be awarded the designated credits.
 2. Make-up examinations may be held for students unable to take tests due to illness or other unavoidable circumstances.
(Submission of dissertations)
- Article 15. Dissertations must be submitted to the dean no later than the designated deadline in accordance with instructions from the supervising committee.
(Dissertation review and final examination)
- Article 16. Dissertation reviews and final examinations shall be governed by the Niigata University Degree Regulations (2004 Reg. 30).
(Completion requirements)
- Article 17. In order to complete a Master's Program, students are required to be enrolled in the program for a minimum of two years, earn credits as provided for in Paragraph 2 of Article 9, and pass dissertation or specific research review and final examination after receiving the necessary research supervision. However, a period of enrollment of at least one year shall be deemed sufficient for students who are deemed to have outstanding academic achievements by the faculty council.
 2. In order to complete a Doctoral Program, students are required to be enrolled in the program for a minimum of three years, earn credits as provided for in Paragraph 3 of Article 9, and pass dissertation review and final examination after receiving the necessary research supervision. However, the period of enrollment stipulated in the provisional clause in Article 32-2 of the NU Graduate School Regulations shall be deemed sufficient for students who are deemed to have outstanding research achievements by the faculty council.
(Recognition of completion)
- Article 18. Recognition of completion pursuant to the preceding Article shall be conducted by the University President after discussions with the faculty council.
(Conferral of degrees)
- Article 19. Students completing a Master's Program shall be awarded a master's degree.
 2. Students completing a Doctoral Program shall be awarded a doctoral degree.
 3. The name of the field added to the degree mentioned in the two preceding paragraphs shall be "Philosophy," "Science," "Engineering," or "Agriculture."
(Teaching certificates)
- Article 20. The types of teaching certificates obtainable through a Master's Program and the certified subjects are as shown in Appended Table 6.
(Miscellaneous provisions)
- Article 21. Necessary matters other than those stipulated in the Regulations shall be determined separately by the faculty council.
Supplementary Provisions

1. These regulations are effective as of April 1, 2004.
2. Notwithstanding the provisions of Article 3, Master's Programs of Fundamental Science of Matter, Advanced Material Science, Industrial Science and Technology, Functional Biology, Plant and Animal Science, Geo-and Biosphere Science, Science of Environmental System, Mathematical Science, and Information and Computer Engineering, as well as Doctoral Programs of Fundamental Science and Energy Technology, Advanced Materials Science and Production Systems Engineering, Biosphere Science, Environmental Management System, and Information Science and Engineering that are based on the 1995 version of the Niigata University Graduate School of Science and Technology Regulations (hereinafter the "former Graduate School Regulations") shall remain until the students enrolled in the departments concerned as of March 31, 2004, are no longer enrolled in the concerned departments, and the registration methods and completion requirements for them shall be governed in accordance with the provisions of the former Graduate School Regulations.

Supplementary Provision

1. The regulations are effective as of October 1, 2005.

(Omitted)

Supplementary Provisions

1. The regulations are effective as of April 1, 2013.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2012 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2014.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2013 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2015.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2014 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2016.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2015 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2017.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2016 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2018.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2017 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2019.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2018 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2020.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2019 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2021.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2020 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Supplementary Provisions

1. These regulations are effective as of April 1, 2022.
2. Registration methods and completion requirements for students who enrolled during or prior to AY2021 shall be governed in accordance with provisions then in effect. However, students currently enrolled on the effective date shall be able to register for class subjects provided in the revised version of Appended Table 2 or Appended Table 3, as stipulated separately, and incorporate these as credits required for completion.

Appended Table 1 (Re. Article 3)

Departments (Programs) and Courses

Master's Programs

Departments	Courses
Fundamental Sciences	Physics
	Chemistry
	Mathematical Science
Advanced Materials Science and Technology	Materials Science and Technology
	Applied Chemistry and Chemical Engineering
	Advanced Mechanical Science and Engineering
	Social Systems Engineering
Electrical and Information Engineering	Information Engineering
	Electrical and Electronic Engineering
	Human Sciences and Assistive Technology
Life and Food Sciences	Life Sciences
	Applied Life and Food Sciences
	Agriculture and Bioresources
Environmental Science and Technology	Natural Environmental Science
	Environmental Science for Agriculture and Forestry
	Architecture and Civil Engineering
	Earth Science
	Natural Disaster and Environmental Science
Field Research in the Environmental Sciences	

Doctoral Programs

Departments	Courses
Fundamental Sciences	Physics
	Chemistry
	Mathematical Science
Advanced Materials Science and Technology	Materials Science and Technology
	Applied Chemistry and Chemical Engineering
	Advanced Mechanical Science and Engineering
Electrical and Information Engineering	Information Engineering
	Electrical and Electronic Engineering
	Human Sciences and Assistive Technology
Life and Food Sciences	Life Sciences
	Applied Life and Food Sciences
	Agriculture and Bioresources
Environmental Science and Technology	Natural Environmental Science
	Environmental Science for Agriculture and Forestry
	Architecture and Civil Engineering
	Earth Science
	Natural Disaster and Environmental Science
	Field Research in the Environmental Sciences

Appended Table 2 (Re. Article 9)

Master's Subject Classes and Credits (available only in Japanese)

Appended Table 3 (Re. Article 9)

Doctoral Subject Classes and Credits (available only in Japanese)

Appended Table 4 (Re. Article 9)

Master's Standard Credit Requirements (available only in Japanese)

Appended Table 5 (Re. Article 9)

Doctoral Standard Credit Requirements (available only in Japanese)

Appended Table 6 (Re. Article 20)

Obtainable Types of Teaching Certificates and Certified Subjects

Departments	Type of Teaching Certificate (Certified Subjects)
Fundamental Sciences	Specialized Teacher's Certificate for Junior High School (Mathematics and science)
	Specialized Teacher's Certificate for High School (Mathematics, science and information studies)
Advanced Materials Science and Technology	Specialized Teacher's Certificate for High School (Industry)
Electrical and Information Engineering	Specialized Teacher's Certificate for High School (Information studies and industry)
Life and Food Sciences	Specialized Teacher's Certificate for Junior High School (Science)
	Specialized Teacher's Certificate for High School (Science and agriculture)
Environmental Science and Technology	Specialized Teacher's Certificate for Junior High School (Science)
	Specialized Teacher's Certificate for High School (Science, agriculture and industry)

Guidelines on Appealing Academic Assessments
Graduate School of Science and Technology

[June 23, 2020
Ruling by the Dean of the Graduate
School of Science and Technology]

Article 1. Purpose

1. These guidelines stipulate necessary matters concerning appealing academic assessments relating to subjects at the Graduate School of Science and Technology.

Article 2. Inquiry

1. In the event that a student has doubts concerning an academic assessment, the student may notify the Academic Affairs Division of the Graduate School of Science and Technology (hereinafter the Academic Affairs Division) upon completing a separately-designated academic assessment confirmation request form (hereinafter Form 1 specified elsewhere) along with the grade confirmation report.
2. The Academic Affairs Division must send the Form 1 and the grade confirmation report submitted by the student immediately to the faculty member in charge of the subject.
3. The faculty member must reply to the Academic Affairs Division within seven days so notified.
4. The Academic Affairs Division shall promptly notify the student of the reply from the faculty member.
5. An inquiry into the grade must be made prior to the end of the grade confirmation period and during a period to be stipulated separately by the graduate school.

Article 3. Appeals

1. If the reply from the inquiry is unsatisfactory, the student may appeal to the dean of the Graduate School of Science and Technology (hereinafter the “dean”).
2. The student wishing to appeal must fill in the necessary items on a separately designated academic assessment appeal form (hereinafter Form 2) and submit this along with the Form 1 to the dean (the Academic Affairs Division).
3. As a general rule, the deadline for appeals shall be three days from the day the reply from the inquiry was received (excluding Saturdays, Sundays, and holidays stipulated in the Act on National Holidays).
4. Upon receiving the student’s appeal, the dean shall conduct a review in cooperation with the Graduate School of Science and Technology Academic Affairs Committee.
5. The student and the faculty member in charge of the course shall be informed of results of the review promptly.
6. The Academic Assessment Appeal Forms and other documents related to the procedure shall be maintained by the Academic Affairs Division.

Supplementary Provision

These Guidelines are effective as of July 1, 2020

II Master's Programs

博士前期課程

(2) Educational Programs / 教育プログラム

○数理物質科学専攻 (博士前期課程) / Department of Fundamental Sciences (Master's Programs)

物理学コース (M) / Physics Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, ethics and humanity
 (B) The ability to understand and apply the fundamental theories and technologies of the field concerned
 (B-1) An understanding of the standard model of elementary particle physics as well as physical sciences that transcend this from experimental and theoretical perspectives
 (B-2) An understanding of the structures and reactions of subatomic quantum systems from quarks and hadrons to atomic nuclei
 (B-3) An understanding of the fundamental laws and basic physical processes behind the origin, structure and evolution of the universe and celestial bodies (general relativistic celestial objects, the early universe, the Milky Way,
 (B-4) An understanding of issues relating to early processes in the formation of the elements that make up the universe as well as the structures of unstable far removed from existing stable nuclei
 (B-5) An understanding of methods to elucidate strongly correlated physical properties by creating strongly correlated substances and engaging in various physical measurements and theoretical considerations
 (B-6) An understanding of experiments and computer simulations relating to the complex physical properties of solid electrolytes, irregular semiconductors, nano-structured materials, etc.
 (B-7) An understanding of various phenomena relating to medical physics, how to observe such phenomena, as well as related laws and regulations
 (B-8) An understanding of teaching methods (active learning, ICT application, educational materials development, etc.) that promote a profound understanding of concepts in university and high school physics education
 (C) The ability to discover and solve problems, the ability to communicate effectively, including academic conference presentations, and the ability to issue reports within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A) (B)	自然科学総論Ⅱ・Ⅲ・Ⅳ・Ⅴ (※いずれか1科目) / General Natural Sciences II・III・IV・V (Choose one)	必修/R	1	99	46	1単位/1	他専攻開設/in other Depts
2 (B)	先端科学技術総論 / Special Topics in Advanced Science and Technology	選択必修/ ReqE	1	99	46	2単位以上/ 2 or more	課程共通科目(a)/M(a)
3	専攻共通科目 / Dept common course(s)	必修/R	-	-	-	2単位以上/2 or more	
4	他専攻科目 / course(s) in other Depts	必修/R	-	-	-	2単位以上/2 or more	
5	実験素粒子物理学Ⅰ / Experimental Elementary Particle Physics I	選択/E	2	43	46		
6	実験素粒子物理学Ⅱ / Experimental Elementary Particle Physics II	選択/E	2	43	57		
7	量子場理論 / Quantum Field Theory	選択/E	2	43	57		
8	共形場理論 / Conformal Field Theory	選択/E	2	43	57		
9	理論素粒子物理学Ⅰ / Theoretical particle physics I	選択/E	2	43	57		
10	理論素粒子物理学Ⅱ / Theoretical particle physics II	選択/E	2	43	57		
11	理論素粒子物理学Ⅲ / Theoretical particle physics III	選択/E	2	43	57		
12	ハドロン物理学Ⅰ / Hadron and Nuclear Physics I	選択/E	2	43	57		
13	原子核物理特論Ⅰ / Topics in Nuclear Physics I	選択/E	2	43	57		
14	原子核物理特論Ⅱ / Topics in Nuclear Physics II	選択/E	2	43	57		
15	原子核物理特論Ⅲ / Topics in Nuclear Physics III	選択/E	2	43	57		
16	核物性学概論 / Nuclear Condensed Matter Physics	選択/E	2	43	57		
17	宇宙物理学特論Ⅰ / Topics in Astrophysics I	選択/E	2	43	57		
18	宇宙物理学特論Ⅱ / Topics in Astrophysics II	選択/E	2	43	46		
19	宇宙物理学特論Ⅲ / Topics in Astrophysics III	選択/E	2	43	57		
20	ミュオン物質物理学概論 / Introduction to Muon Science	選択/E	2	43	57		
21	原子核量子多体論概論 / Nuclear Quantum Many-Body Theory : Basic	選択/E	2	43	57		
22	不安定核物性学概論 / Introduction to the physics of unstable nuclei	選択/E	2	43	57		
23	固体物性物理学Ⅰ / Solid State Physics I	選択/E	2	43	46		
24	固体物性物理学Ⅱ / Solid State Physics II	選択/E	2	43	57		
25	固体物性物理学Ⅲ / Solid State Physics III	選択/E	2	43	57		
26	固体物性物理学Ⅳ / Solid State Physics IV	選択/E	2	43	46		
27	固体電子論 / Electron Theory of Solids	選択/E	2	43	57		
28	統計物理学Ⅰ / Statistical Physics I	選択/E	2	43	57		
29	統計物理学Ⅱ / Statistical Physics II	選択/E	2	43	57		
30	多体系物理学 / Many-Body Physics	選択/E	2	43	46		
31	医学物理学総論 / Introduction to Medical Physics	選択/E	2	43,87	46		
32	放射線物理学特論 / Topics in Radiation Physics	選択/E	2	43,87	57		
33	放射線計測学特論 / Topics in Radiation Measurements	選択/E	2	43,87	57		
34	放射線防護学特論 / Topics in Radiation Protection	選択/E	2	43,87	57		
35	放射線関連法規 / Radiation Related Laws	選択/E	2	43,87	57		
36	アクティブ・ラーニング型物理教授法特論 / Active Learning Teaching Strategies in Physics	選択/E	2	43	57		
37	ICT活用物理教授法特論 / Teaching Strategies in Physics using Technology	選択/E	2	43	57		
38	教職実践学校インターンシップ / School Internship (Teaching Practice)	選択/E	4	43	57		課程共通科目(a)/M(a)
39	コラボレーション演習 / Collaboration Exercise	選択/E	1	43	56		
40	課題探索特講Ⅰ / Advanced Course for Project Research I	選択/E	2	43	56		
41	課題探索特講Ⅱ / Advanced Course for Project Research II	選択/E	2	43	56		
42	データサイエンス概論 / Introduction to Data Science	選択/E	2	10,49	36		課程共通科目(a)/M(a)
43	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(b)/M(b)
44	企業における生産・開発Ⅰ / Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(b)/M(b)
45	修士のためのインターンシップ / Internship for master's courses	選択/E	1	74	47		課程共通科目(b)/M(b)
46	企業・研究機関の研修・見学 / Tour/Visit to Businesses and Research Institutes	選択/E	1	74	46		課程共通科目(b)/M(b)
47	薬品安全管理技術 / Safety Management of Chemicals	選択/E	2	46	46		課程共通科目(b)/M(b)
48	大型機器分析技術 / Techniques in instrumental analysis	選択/E	2	99	46		課程共通科目(b)/M(b)
49	知的財産権・技術経営論Ⅰ / Intellectual property rights and theory of Management Technology I	選択/E	1	99	46		課程共通科目(b)/M(b)
50	知的財産権・技術経営論Ⅱ / Intellectual property rights and theory of Management Technology II	選択/E	1	99	46		課程共通科目(b)/M(b)
51	インターンシップ / Internship	選択/E	1	74	36		課程共通科目(b)/M(b)
52	ワーク・ライフ・バランス / Work・Life・Balance	選択/E	1	74	36		課程共通科目(b)/M(b)
53	海外英語研修 / Intensive Academic English Training Program for Science, Agriculture and Engineering Majors	選択/E	4	70	46		課程共通科目(b)/M(b)
54	海外インターンシップ / International Professional/Academic Internship	選択/E	4	74	46		課程共通科目(b)/M(b)
55	科学技術英語Ⅰ / English for Science and Technology Majors I	選択/E	1	70	46		課程共通科目(b)/M(b)
56	科学技術英語Ⅱ / English for Science and Technology Majors II	選択/E	1	70	46		課程共通科目(b)/M(b)
57	修士のためのキャリアマネジメントセミナー / Career Management Seminar for Postgraduate students	選択/E	2	74	37		課程共通科目(b)/M(b) 2021年度新設 / New course
58	数理物質科学特定研究Ⅰ (物理学) / Projective Research in Physics I	必修/R	8	43,77	57		
59	数理物質科学特定研究ⅡA (物理学) / Projective Research in Physics IIA	必修/R	4	43,77	57		
60	数理物質科学特定研究ⅡB (物理学) / Projective Research in Physics IIB	選択/E	4	43,77	57		
61	数理物質科学演習Ⅰ (物理学) / Seminar in Physics I	必修/R	4	43	57		
62	数理物質科学演習Ⅱ (物理学) / Seminar in Physics II	選択/E	4	43	57		
63	所属専攻科目 / Department course(s)	選択/E	-	-	-		

合計38単位以上 / Total: 38 credits or more

- 【備考】 1. 課程共通科目(a)は、所属専攻の科目として取り扱う。
 2. 課程共通科目(b)は、他専攻の科目として取り扱う。(必修の「他専攻科目2単位」に含めることができないので注意すること。)

- 【Notes】 1. M(a) indicates Master's common courses(a). They are treated as Department courses.
 2. M(b) indicates Master's common courses(b). They are treated as courses in other Departments. (Attention: Master's common courses(b) do not count toward the two credits required in "courses in other Departments.")

3. 必修授業科目履修の流れ (コースワークリサーチワーク)

セメスター	(A)	(B)	(C)
1期	自然科学総論	他専攻科目, 専門科目	数理物質科学特定研究Ⅰ (物理学) 数理物質科学演習Ⅰ (物理学)
2期		専門科目	数理物質科学特定研究Ⅰ (物理学) 数理物質科学演習Ⅰ (物理学)
3期		専門科目	数理物質科学特定研究ⅡA (物理学)
4期		専門科目	数理物質科学特定研究ⅡB (物理学)

化学コース（M）／Chemistry Course（M）

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies
- (B-1) The ability to understand and elucidate the reactions and structures of inorganic substances from the atomic and molecular levels
- (B-2) The ability to understand and elucidate the synthesis methods as well as function, structure and reaction mechanisms of organic compounds
- (B-3) The ability to understand and elucidate the molecular functions of bio-polymers and functional analyses based on genomic information
- (B-4) The ability to understand and elucidate the structures and phase transitions of substances on the mesoscale, and understand the development of data analysis methods and numeric calculation technologies
- (B-5) The ability to understand and elucidate the fundamental processes for each quantum state in a range of chemical reactions both theoretically and experimentally, and understand data analysis methods
- (C) The ability to discover and solve problems
- (D) The ability to communicate effectively, including academic conference presentations
- (E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A) (B)	自然科学総論Ⅱ・Ⅲ・Ⅳ・Ⅴ(*いずれか1科目) ／General Natural Sciences Ⅱ・Ⅲ・Ⅳ・Ⅴ(*Choose one)	必修/R	1	99	46	1単位/1	他専攻開設 ／in other Depts
2	先端科学技術総論／Special Topics in Advanced Science and Technology	必修/R	1	99	46	1単位/1	課程共通科目(a)/M(a)
3	専攻共通科目／Dept common course(s)	選択必修/ReqE	-	-	-	2単位以上/ 2 or more	
4	他専攻科目及び下記の課程共通科目／course(s) in other Depts & the following Master's common courses		-				
5	企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I		1				課程共通科目(b)/M(b)
6	企業・研究機関の研修・見学／Tour/Visit to Businesses and Research Institutes		1				課程共通科目(b)/M(b)
7	薬品安全管理技術／Safety Management of Chemicals		2				課程共通科目(b)/M(b)
8	大型機器分析技術／Techniques in instrumental analysis		2				課程共通科目(b)/M(b)
9 (B)	知的財産権・技術経営論Ⅰ／Intellectual property rights and theory of Management Technology I		1				課程共通科目(b)/M(b)
10	知的財産権・技術経営論Ⅱ／Intellectual property rights and theory of Management Technology II		1				課程共通科目(b)/M(b)
11	インターンシップ／Internship	選択必修/ ReqE	1			2単位以上/ 2 or more	課程共通科目(b)/M(b)
12	ワーク・ライフ・バランス／Work・Life・Balance		1				課程共通科目(b)/M(b)
13	海外英語研修／Intensive Academic English Training Program for Science, Agriculture and Engineering Majors		4				課程共通科目(b)/M(b)
14	海外インターンシップ／International Professional/Academic Internship		4				課程共通科目(b)/M(b)
15	教職実践学校インターンシップ／School Internship (Teaching Practice)		4				課程共通科目(b)/M(b)
16	科学技術英語Ⅰ／English for Science and Technology Majors I		1				課程共通科目(b)/M(b)
17	科学技術英語Ⅱ／English for Science and Technology Majors II		1				課程共通科目(b)/M(b)
18	分析化学特論Ⅰ／Topics in Analytical Chemistry I	選択/E	2	46	47		
19 (B-1)	分析化学特論Ⅱ／Topics in Analytical Chemistry II	選択/E	2	46	57		
20	核化学特論／Topics in Nuclear Chemistry	選択/E	2	46	47		
21	有機合成方法論Ⅰ／Topics in Organic Chemistry I	選択/E	2	46	57		
22 (B-2)	有機合成方法論Ⅱ／Topics in Organic Chemistry II	選択/E	2	46	47		
23	構造有機化学特論／Topics in Structural Organic Chemistry	選択/E	2	46	57		
24	反応有機化学特論／Topics in Organic Reaction Chemistry	選択/E	2	46	47		
25 (B-3)	分子生理化学／Molecular Physiological Chemistry	選択/E	2	46	47		
26	分子細胞化学／Advanced Molecular Cytochemistry	選択/E	2	46	57		
27 (B-4)	凝縮相物性論／Structure and Property of Condensed Matter	選択/E	2	46	57		
28	分子動力学概論／Introduction to Molecular Dynamics Simulation	選択/E	2	46	47		
29 (B-5)	反応化学概論／Introduction to Reaction Kinetics and Dynamics	選択/E	2	46	47		
30	化学反応計測学／Metrology for Chemical Reaction	選択/E	2	46	57		
31	数理解物質科学特定研究Ⅰ（化学）／Projective Research in Chemistry I	必修/R	8	46,77	57		
32	数理解物質科学特定研究ⅡA（化学）／Projective Research in Chemistry IIA	必修/R	4	46,77	57		
33	数理解物質科学特定研究ⅡB（化学）／Projective Research in Chemistry IIB	必修/R	4	46,77	57		
34	数理解物質科学演習Ⅰ（化学）／Seminar in Chemistry I	必修/R	4	46	57		
35 (C) (D) (E)	科学技術英語／English in Science and Technology	選択/E	2	46	57		
36	コミュニケーション演習／Communication Exercise	選択/E	2	46	57		
37	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択/E	2	74	37		課程共通科目(a)/M(a) 2021年度新設/New course
38	プロジェクト研究特別概説／Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a)/M(a)
39	所属専攻科目／Department course(s)	選択/E	-	-	-		
						合計38単位以上／Total: 38 credits or more	

【備考】1. 課程共通科目(a)は、所属専攻の科目として取り扱う。

2. 課程共通科目(b)は、他専攻の科目として取り扱う。

【Notes】1 M(a) indicates Master's common courses(a). They are treated as Department courses.

2 M(b) indicates Master's common courses(b). They are treated as courses in other Departments.

3. 必修授業科目履修の流れ（コースワーク+リサーチワーク）

セメスター	(A)	(B)	(C) (D) (E)
1期	自然科学総論	共通科目（必修） 先端科学技術総論 他専攻科目，専門科目	数理解物質科学特定研究Ⅰ（化学） 数理解物質科学演習Ⅰ（化学）
2期		専門科目	数理解物質科学特定研究Ⅰ（化学） 数理解物質科学演Ⅰ（化学）
3期		専門科目	数理解物質科学特定研究ⅡA（化学）
4期		専門科目	数理解物質科学特定研究ⅡB（化学）

数理科学コース（M）／Mathematical Science Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

(A) The ability to make ethical judgements regarding nature, society and humanity

(B) Development of an orderly, logical way of thinking and the ability to solve problems through studying mathematics

(C) The ability to understand and apply theories in various fields related to mathematical science and information science, in particular algebra, geometry, analysis, and information mathematics; Development of abilities within one or more of the following three fields

(C-1) The ability to systematically understand and apply knowledge of the structures of function spaces, the structures of the operators thereof, and the structures of rings formed from operators and functions

(C-2) The ability to systematically understand and apply theories in algebraic geometry, number theory, topology, and differential geometry

(C-3) The ability to understand and apply theories in algebra, such as mathematical expression processing, ciphers, codes, etc., theories in mathematical statistics, such as time series analyses, mathematical finance, etc., and information science, such as mathematical planning and optimization theory, including OR, etc.

(D) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(B) (C) (D)	1 数理物質科学特定研究Ⅰ（数学）／Projective Research in Mathematical Science I	必修/R	8	41,77	57	29単位/29	(数学コース/Math)
	2 数理物質科学特定研究Ⅰ（情報）／Projective Research in Information Science I	必修/R	8	41,77	57		(情報コース/Info)
	3 数理物質科学特定研究Ⅱ（数学）／Projective Research in Mathematical Science II	必修/R	8	41,77	57		(数学コース/Math)
	4 数理物質科学特定研究Ⅱ（情報）／Projective Research in Information Science II	必修/R	8	41,77	57		(情報コース/Info)
	5 数理科学セミナーⅠ（数学）／Seminar in Mathematical Science I	必修/R	3	41	57		(数学コース/Math)
	6 数理科学セミナーⅠ（情報）／Seminar in Information Science I	必修/R	3	41	57		(情報コース/Info)
	7 数理科学セミナーⅡ（数学）／Seminar in Mathematical Science II	必修/R	3	41	57		(数学コース/Math)
	8 数理科学セミナーⅡ（情報）／Seminar in Information Science II	必修/R	3	41	57		(情報コース/Info)
	9 数理科学文献詳読Ⅰ（数学）／Literature Reading in Mathematical Science I	必修/R	3	41	56		(数学コース/Math)
	10 数理科学文献詳読Ⅰ（情報）／Literature Reading in Information Science I	必修/R	3	41	56		(情報コース/Info)
	11 数理科学文献詳読Ⅱ（数学）／Literature Reading in Mathematical Science II	必修/R	3	41	57		(数学コース/Math)
	12 数理科学文献詳読Ⅱ（情報）／Literature Reading in Information Science II	必修/R	3	41	57		(情報コース/Info)
	13 数理科学研究発表演習〔中間発表〕（数学）／Presentation Exercise in Mathematical Science	必修/R	1	41,77	56		(数学コース/Math)
	14 数理科学研究発表演習〔中間発表〕（情報）／Presentation Exercise in Information Sciences	必修/R	1	41,77	56		(情報コース/Info)
15 (A) (B)	自然科学総論Ⅱ・Ⅲ・Ⅳ・Ⅴ（※いずれか1科目） ／General Natural Sciences II・III・IV・V(*Choose one)	必修/R	1	99	46	1単位/1	他専攻開設/in other Depts
16 (A) (B)	他の専攻で開設する授業科目/course(s) in other Depts	選択/E	-	-	-		
(D)	17 プロジェクト研究特別概説／Introduction to University Research Projects	選択/E	1	99	47	2単位以上/ 2 or more	課程共通科目(b)／M(b)
	18 修士のためのインターンシップ／Internship for master's courses	選択/E	1	74	47		課程共通科目(b)／M(b)
	19 企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I	選択/E	1	74	47		他専攻開設/in other Depts
	20 数理科学研究発表〔外部発表〕（数学）／Presentation in Mathematical Science	選択/E	2	41,77	57		
	21 数理科学研究発表〔外部発表〕（情報）／Presentation in Information Science	選択/E	2	41,77	57		
22	先端科学技術総論／Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(a)／M(a)
(C-1)	23 関数解析特論／Advanced Functional Analysis	選択/E	2	41	57	6単位以上/ 6 or more	
	24 複素解析特論／Select topics on Complex Analysis	選択/E	2	41	57		
	25 関数空間特論／Advanced Theory of Function Spaces	選択/E	2	41	57		
	26 偏微分方程式特論／Select topics on Partial Differential Equations	選択/E	2	41	57		
(C-2)	27 代数構造特論／algebraic structures	選択/E	2	41	57		
	28 代数的整数論／Algebraic Number Theory	選択/E	2	41	57		
	29 位相幾何学特論／Advanced Theory of Topology	選択/E	2	41	57		
	30 可換環論／Commutative Ring Theory	選択/E	2	41	57		
31	微分位相幾何学特論／Differential Topology	選択/E	2	41	57		
(C-3)	32 情報統計学概論／Introduction to Information Statistics	選択/E	2	41	57		
	33 応用統計学概論／Introduction to Applied Statistics	選択/E	2	41	57		
	34 数理計画概論／Introduction to Mathematical Programming	選択/E	2	41	47		
	35 数理システム概論／Introduction to Mathematical Systems	選択/E	2	41	47		
	36 最適化概論／Introduction to Optimization	選択/E	2	41	57		
37	ベイズ統計学概論／Introduction to Bayesian Statistics	選択/E	2	41	57		

必修32単位、計38単位以上／Total: 38 credits or more including 32 credits in required courses

【備考】1. 課程共通科目(a)は、所属専攻の科目として取り扱う。

2. 課程共通科目(b)は、他専攻の科目として取り扱う。

【Notes】1 M(a) indicates Master's common courses(a). They are treated as Department courses.

2 M(b) indicates Master's common courses(b). They are treated as courses in other Departments.

3. 授業科目履修の流れ（コースワーク＋リサーチワーク）

セメスター	必修科目	選択科目
1期	数理科学セミナーⅠ（数学），数理科学文献詳読Ⅰ（数学）	専門科目
	数理物質科学特定研究Ⅰ（数学），自然科学総論	
2期	数理科学研究発表演習（数学），他専攻専門科目	
3期	数理科学セミナーⅡ（数学），数理科学文献詳読Ⅱ（数学）	専門科目
	数理物質科学特定研究Ⅱ（数学）	
4期		数理科学研究発表（数学）

※2021年度から廃止した科目 「積分方程式特論」，「リーマン幾何学特論」，「幾何学的群論」

○材料生産システム専攻（博士前期課程）／Department of Advanced Materials Science and Technology (Master's Programs)

機能材料科学コース（M）／Materials Science and Technology Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to understand and apply fundamental theories and technologies
 (A-1) The ability to understand fundamental theories and technologies in functional materials science
 (A-2) The ability to understand and apply fundamental theories and technologies in optoelectronic materials, metallic hydrogen system-based materials, and magnetic and superconductive materials
 (A-3) The ability to understand and apply fundamental theories and technologies in inorganic nanomaterials, hybrid materials, biomaterials, etc.
 (A-4) Development of a broad perspective regarding the material production
 (A-5) Development of a broad perspective regarding the natural sciences
 (B) The ability to make ethical judgements regarding nature, society and humanity
 (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes			
1 (A-1)	機能材料科学総論Ⅰ／General Lectures on Materials Science and Technology I	選択必修/ReqE	1	54	57	1単位以上/ 1 or more				
	機能材料科学総論Ⅱ／General Lectures on Materials Science and Technology II	選択必修/ReqE	1	54	57					
3 (A-2)	固体電子材料論／Materials for Solid State Electronics	選択/E	2	54	47	(A-2)から4単位以上、(A-1)と(A-3)と(A-4)から4単位以上				
	金属材料物性論／Metal Physics	選択/E	2	54	47					
	光物性特論／Optical Properties of Solids	選択/E	2	54	57					
	磁性材料物性論／Physical Properties of Magnetic Materials	選択/E	2	54	47					
	電子物性論／Solid State Physics	選択/E	2	54	46					
7	水素制御管理特論／Hydrogen control management	選択/E	2	54	57	(A-3)から4単位以上、(A-1)と(A-2)から4単位以上	ソーラープログラム学生用/for Solar Prgrm			
9 (A-3)	電子移動反応論／Electron Transfer Reaction	選択/E	2	54	57	4 or more in (A-2) and 4 or more in (A-1) & (A-3) & (A-4) or 4 or more in (A-3) and 4 or more in (A-1) & (A-2) & (A-4)				
	表面光化学／Surface Photochemistry	選択/E	2	54	57					
	応用無機材料化学／Applied Inorganic Chemistry	選択/E	2	54	57					
	複合材料設計化学／Chemical Design of Composite Materials	選択/E	2	54	57					
	生物機能工学／Biofunctional engineering	選択/E	2	54	56					
	機能性材料評価学特論／Evaluation of Functional Materials	選択/E	2	54	57					
	生物機能材料科学／Biofunctional Materials	選択/E	2	54	57					
15	ソフトマテリアル特論／Soft Materials	選択/E	2	56	46					
17 (A-4)	所属専攻科目／course(s) inside the Dept	選択/E	-	-	-					
18 (A-5)	他専攻科目／course(s) outside the Dept	選択必修/ReqE	2	-	-					
19-28	プロジェクト研究特別概説／Introduction to University Research Projects	選択必修/ ReqE	1	99	47	他専攻2単位を含む、2単位以上/ 2 or more oncl. 2 or more outside the Dept	課程共通科目(b)/M(b)			
	企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I		1	74	47		課程共通科目(b)/M(b)			
	修士のためのインターンシップ／Internship for master's courses		1	74	47		課程共通科目(b)/M(b)			
	知的財産権・技術経営論Ⅰ／Intellectual property rights and theory of Management Technology I		1	99	46		課程共通科目(b)/M(b)			
	知的財産権・技術経営論Ⅱ／Intellectual property rights and theory of Management Technology II		1	99	46		課程共通科目(b)/M(b)			
	インターンシップ／Internship		1	74	46		課程共通科目(b)/M(b)			
	大型機器分析技術／Techniques in instrumental analysis		2	99	46		課程共通科目(b)/M(b)			
	科学技術英語Ⅰ／English for Science and Technology Majors I		1	70	46		課程共通科目(b)/M(b)			
	科学技術英語Ⅱ／English for Science and Technology Majors II		1	70	46		課程共通科目(b)/M(b)			
	水素エネルギーシステムデザイン演習・実習Ⅲ／Practice III for Designing Hydrogen Energy Systems		選択/E	2	54,47		46	ソーラープログラム学生用/for Solar Prgrm		
	29 (B) (C)		材料生産システム特定研究Ⅰ／Project Research in Advanced Materials Science and Technology I	必修/R	8		77	57	32単位以上/ 32 or more	
	30		材料生産システム特定研究Ⅱ／Project Research in Advanced Materials Science and Technology II	必修/R	8		77	57		
	31		機能材料科学セミナーⅠ／Seminar for Materials Science and Technology I	必修/R	3		54	57		
32	機能材料科学セミナーⅡ／Seminar for Materials Science and Technology II	必修/R	3	54	57					
33	機能材料科学文献詳読Ⅰ／Colloquia for Technical Reading on Materials Science and Technology I	必修/R	3	54,70	56					
34	機能材料科学文献詳読Ⅱ／Colloquia for Technical Reading on Materials Science and Technology II	必修/R	3	54,70	56					
35	機能材料科学演習／Course Work on Materials Science and Technology	必修/R	2	54	56					
36	自然科学総論Ⅰ・Ⅲ・Ⅳ・Ⅴ(*いづれか1科目) ／General Natural Sciences I・III・IV・V(*Choose one)	必修/R	1	99	46	他専攻開設/in other Depts				
37	研究発表演習・発表／Seminar on Research Report / Presentation	必修/R	1	99,77	57					
38	企業・研究機関の研修・見学／Tour/Visit to Businesses and Research Institutes	選択/E	1	74	56	課程共通科目(a)/M(a)				
39	先端科学技術総論／Special Topics in Advanced Science and Technology	選択/E	1	99	46	課程共通科目(a)/M(a)				
40	薬品安全管理技術／Safety Management of Chemicals	選択/E	2	46	46	課程共通科目(a)/M(a)				
41	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択/E	2	74	37	課程共通科目(a)/M(a) 2021年度新設 / New course				

Total: 42 credits or more including 32 credits or more in required courses and 10 credits or more in elective courses (incl. 2 credits or more in other Departments)

- 【備考】 1. 課程共通科目(a)は、所属専攻の科目として取り扱う。
 2. 課程共通科目(b)は、他専攻の科目として取り扱う。

- 【Notes】 1 M(a) indicates Master's common courses(a). They are treated as Department courses.
 2 M(b) indicates Master's common courses(b). They are treated as courses in other Departments.

3. 必修授業科目履修の流れ（コースワーク）

セメスター	(A-1) (A-2)および(A-3)	(B) (C)
1期		材料生産システム特定研究Ⅰ 機能材料科学セミナーⅠ 機能材料科学文献詳読Ⅰ
2期	専門科目（3科目以上）	機能材料科学演習 プロジェクト研究特別概説 自然科学総論
3期		企業における生産・開発Ⅰ 先端科学技術総論
4期		材料生産システム特定研究Ⅱ 機能材料科学セミナーⅡ 機能材料科学文献詳読Ⅱ

4. 次世代ソーラー水素エネルギーシステム人材育成養成プログラム

プログラムの詳細は、●ページを参照してください。

素材生産科学コース (M) / Applied Chemistry and Chemical Engineering Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies in the natural sciences
- (B-1) An understanding of applied chemical technologies, and the ability to apply these in designing, synthesizing and elucidating the functions of highly functional materials
- (B-2) An understanding of chemical engineering technologies and methodologies, and the ability to apply these in building efficient, eco-friendly systems for production, usage, recycling, and waste detoxification
- (C) The ability to discover and solve problems; The ability to communicate effectively, including academic presentations; The ability to issue reports within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論 I・III・IV・V (*いずれか1科目) / General Natural Sciences I・III・IV・V (*Choose one)	必修/R	1	99	46	5単位/ 5 or more	他専攻開設 / in other Depts
	素材生産科学文献詳読 I / Colloquia and Discussions for Applied Chemistry and Chemical Engineering I	必修/R	2	47	56		
	素材生産科学セミナー I / Seminar for Applied Chemistry and Chemical Engineering I	必修/R	2	47	57		
	素材生産科学総論 / General Lecture on Applied Chemistry and Chemical Engineering	選択/E	2	99	57		
5	企業・研究機関の研修・見学 / Tour / Visit to Businesses and Research Institutes	選択/E	1	74	56		課程共通科目(b)/M(b)
6	他専攻科目 / course(s) in other Depts	選択必修/ReqE	2	-	-		
7 (B-1)	機能性高分子合成化学 / Chemistry of functional polymers	選択/E	2	47	57	他専攻科目を2単位以上, 所属専攻科目を12 単位以上(※) / 2 or more in other Depts, 12 or more in the Dept(※)	
	表面計測化学 / Surface Instrumentation Chemistry	選択/E	2	47	57		
	機能性高分子材料化学 / Chemistry of Functional Polymer Materials	選択/E	2	47	57		
	励起分子化学 / Chemistry of Excited Organic Molecules	選択/E	2	47	57		
	エネルギー化学特論 / Energy and Fuel Chemistry	選択/E	2	47	57		
	精密高分子合成化学 / Well-Controlled Polymer Synthesis	選択/E	2	47	57		
	無機物性化学 / Inorganic materials chemistry	選択/E	2	47	57		
	精密分子設計化学 / Molecular Design Chemistry	選択/E	2	47	57		
	環境計測化学 / Environmental Analysis	選択/E	2	47	57		
	無機材料物性化学 / Physics and Chemistry of Inorganic Materials	選択/E	2	47	57		
	水素エネルギー製造・輸送論 / Hydrogen Production & Transport	選択/E	2	47	57		
	エネルギー材料解析化学 / Physics and Chemistry of Energy Material	選択/E	2	47	57		
	精密反応設計化学 / Organic Synthetic Chemistry	選択/E	2	47	57		
	20	微粒子材料工学特論 / Advanced Fine Particulate Materials Engineering	選択/E	2	55		57
21	応用移動現象特論 / Advanced Transport Phenomena	選択/E	2	55	57		
22	資源エネルギー工学 / Energy and Resources Engineering	選択/E	2	55	57		
23	環境プロセス工学 / Environmental Chemical Engineering	選択/E	2	55	57		
24	粉体工学特論 / Advanced Powder Technology	選択/E	2	55	57		
25	乳分散系化学特論 / Colloid and surface chemistry	選択/E	2	55	57		
26	拡散操作特論 / Advanced Diffusional Operations	選択/E	2	55	57		
27	企業における生産・開発 I / Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(a)/M(a)
28	修士のためのインターンシップ / Internship for master's courses	選択/E	1	74	47		課程共通科目(a)/M(a)
29	先端科学技術総論 / Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(b)/M(b)
30	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(b)/M(b)
31	薬品安全管理技術 / Safety Management of Chemicals	選択/E	2	46	46		課程共通科目(a)/M(a)
32	知的財産権・技術経営論 I / Intellectual property rights and theory of Management Technology I	選択/E	1	99	46		課程共通科目(b)/M(b)
33	知的財産権・技術経営論 II / Intellectual property rights and theory of Management Technology II	選択/E	1	99	46		課程共通科目(b)/M(b)
34	インターンシップ / Internship	選択/E	1	74	46		課程共通科目(b)/M(b)
35	大型機器分析技術 / Techniques in instrumental analysis	選択/E	2	99	46		課程共通科目(a)/M(a)
36	ワーク・ライフ・バランス / Work・Life・Balance	選択/E	1	74	46		課程共通科目(b)/M(b)
37	科学技術英語 I / English for Science and Technology Majors I	選択/E	1	70	46		課程共通科目(b)/M(b)
38	科学技術英語 II / English for Science and Technology Majors II	選択/E	1	70	46		課程共通科目(b)/M(b)
39	水素エネルギーシステム設計の演習・実習 I / Practice I for Designing Hydrogen Energy Systems	選択/E	2	47	57		ナレッジ・ラボ学生用 / for Solar Prgm
40	素材生産科学特別演習 / Course Work in Applied Chemistry and Chemical Engineering	必修/R	2	47	57	23単位/ 23 or more	
41	材料生産システム特定研究 I / Project Research in Advanced Materials Science and Technology I	必修/R	8	77	57		
42	材料生産システム特定研究 II / Project Research in Advanced Materials Science and Technology II	必修/R	8	77	57		
43	素材生産科学文献詳読 II / Colloquia and Discussions for Applied Chemistry and Chemical Engineering II	必修/R	2	47	56		
44	素材生産科学セミナー II / Seminar for Applied Chemistry and Chemical Engineering II	必修/R	2	47	57		
45	研究発表演習・発表 / Seminar on Research Report / Presentation	必修/R	1	99.77	57		

Total: 42 credits or more including 28 credits or more in required courses and 14 credits or more in elective courses (including 2 credits or more in other Departments and 12 credits or more in the Department)

※「他専攻科目」には課程共通科目(b)を、「所属専攻科目」には材料生産システム専攻の他コースで開設する科目及び課程共通科目(a)を含む。/M(b) indicates Master's common courses(b). They are included in "courses in other Departments." M(a), or Master's common courses(a), as well as courses in other Courses in the Department of Advanced Materials Science and Technology are included in "Department courses."

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(A)	(B)	(C)
1期	自然科学総論	他専攻専門科目 (専門科目)	素材生産科学特別演習 材料生産システム特定研究 I
2期	素材生産科学文献詳読 I 素材生産科学セミナー I		
3期			素材生産科学文献詳読 II 素材生産科学セミナー II
4期			材料生産システム特定研究 II

4. 次世代ソーラー水素エネルギーシステム人材育成養成プログラム

プログラムの詳細は、●ページを参照してください。

機械科学コース (M) / Advanced Mechanical Science and Engineering Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)
 (A) The ability to make ethical judgements regarding nature, society and humanity, and a fundamental grounding in mechanical science and engineering
 (B) The ability to understand and apply fundamental theories and technologies
 (B-1) An understanding of technologies for designing and manufacturing nanomaterials, super-functional materials, devices, etc., and the ability to apply these in development
 (B-2) An understanding of technologies for measuring and analyzing the dynamic characteristics of machinery, and the ability to apply these in designing highly efficient production systems
 (B-3) An understanding of material control technologies for plasticity control, nano-processing, micro-electromechanical systems, etc., and the ability to apply these in design and development
 (C) The ability to discover and solve problems, the ability to communicate effectively, including academic conference presentations, and the ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 (A)	自然科学総論 I・III・IV・V (*いずれか1科目) /General Natural Sciences I・III・IV・V(*Choose one)	必修/R	1	99	46	5単位/ 5 or more	他専攻開設/in other Depts
	機械科学文献詳読 I / Colloquia for Technical Reading on Mechanical Science and Engineering I	必修/R	2	50	56		
	機械科学セミナー I / Seminar in Mechanical Science and Engineering I	必修/R	2	50	57		
	企業・研究機関の研修・見学 / Tour/Visit to Businesses and Research Institutes	選択/E	1	74	56		
	機械科学総論 / General Lecture on Mechanical Science and Engineering	選択/E	2	50	56		
6 7 (B)	他専攻科目 / course(s) in other Depts	選択必修 /ReqE	2以上 /2 or more	-	-		
	所属専攻内の他コース専門科目 / course(s) in other Courses in the Dept	選択/E	-	-	-		
8 9 10 11 12 (B-1)	エネルギー変換論 / Advanced Technology of Energy Conversion	選択/E	2	50	56		
	先端機器・機械論 / Frontier Technology and Mechanistic Theory	選択/E	2	50	57		
	環境エネルギー工学 / Environmental Energy Engineering	選択/E	2	50	57		
	連続体力学特論 / Continuum Mechanics	選択/E	2	50	57		
	集光・集熱技術論 / Concentrating Solar Thermal Technologies and Their Applications	選択/E	2	50	57		
13 14 15 16 17 (B-2)	機械情報可視化論 / Flow visualization and image analysis	選択/E	2	50	57		
	振動解析・制御特論 / Analysis and control of dynamic systems	選択/E	2	50	57		
	非線形システム制御論 / Nonlinear Control Systems	選択/E	2	50	57		
	機械音響工学論 / Advanced Mechanical Acoustic Engineering	選択/E	2	50	57		
	マイクロロボティクス論 / Microrobotics	選択/E	2	50	57		
18 19 20 21 22 23 (B-3)	生産加工学特論 / Manufacturing Technology	選択/E	2	50	57	他専攻科目を2 単位以上、 所属専攻科目を 12単位以上 (注) / 2 or more in other Depts, 12 or more in the Dept (note)	
	トライボロジー論 / Advanced Tribology	選択/E	2	50	57		
	残留応力解析論 / Analysis on residual stresses	選択/E	2	50	57		
	マイクロマシン工学特論 / Micromachine Engineering	選択/E	2	50	57		
	機械材料学特論 / Engineering Materials	選択/E	2	50	57		
24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 (C)	企業における生産・開発 I / Lecture on Manufacturing and Development Research I	選択/E	1	74	47	23単位/ 23 or more	課程共通科目(a) / M(a)
	修士のためのインターンシップ / Internship for master's courses	選択/E	1	74	47		
	修士のためのキャリアマネジメントセミナー / Career Management Seminar for Postgraduate students	選択/E	2	74	37		
	先端科学技術総論 / Special Topics in Advanced Science and Technology	選択/E	1	99	46		
	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		
	薬品安全管理技術 / Safety Management of Chemicals	選択/E	2	46	46		
	知的財産権・技術経営論 I / Intellectual property rights and theory of Management Technology I	選択/E	1	99	46		
	知的財産権・技術経営論 II / Intellectual property rights and theory of Management Technology II	選択/E	1	99	46		
	インターンシップ / Internship	選択/E	1	74	46		
	大型機器分析技術 / Techniques in instrumental analysis	選択/E	2	99	46		
	ワーク・ライフ・バランス / Work・Life・Balance	選択/E	1	74	46		
	科学技術英語 I / English for Science and Technology Majors I	選択/E	1	70	46		
	科学技術英語 II / English for Science and Technology Majors II	選択/E	1	70	46		
	水素エネルギーシステムデザイン演習・実習 II / Practice II for Designing Hydrogen Energy Systems	選択/E	2	47	46		
	機械科学特別演習 / Course Work on Mechanical Science and Engineering	必修/R	2	50	57		
材料生産システム特定研究 I / Project Research in Advanced Materials Science and Technology I	必修/R	8	77	57			
材料生産システム特定研究 II / Project Research in Advanced Materials Science and Technology II	必修/R	8	77	57			
機械科学文献詳読 II / Colloquia for Technical Reading on Mechanical Science and Engineering II	必修/R	2	50	56			
機械科学セミナー II / Seminar in Mechanical Science and Engineering II	必修/R	2	50	57			
研究発表演習・発表 / Seminar on Research Report / Presentation	必修/R	1	99,77	57			
必修28単位以上、選択14単位以上 (他専攻専門科目2単位以上、所属専攻の専門科目12単位以上を含む)、総計42単位以上 Total: 42 credits or more including 28 credits or more in required courses and 14 credits or more in elective courses (including 2 credits or more in other Departments and 12 credits or more in the Department)							

- 【備考】 (注) 「所属専攻科目」には課程共通科目(a)を含む。
 【Note】 (注) M(a) indicates Master's common courses. They are included in "Department courses."

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

Semester	(A)	(B)	(C)
1期	自然科学総論, 機械科学文献詳読 I	他専攻専門科目	機械科学特別演習
2期	機械科学セミナー I		材料生産システム特定研究 I, 専門科目
3期		専門科目	機械科学文献詳読 II, 機械科学セミナー II
4期			材料生産システム特定研究 II, 研究発表演習・発表

4. 次世代ソーラー水素エネルギーシステム人材育成養成プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止した科目 「非ニュートン流体工学特論」, 「運動伝達要素論」, 「固体機能・強度解析論」

社会システム工学コース (M) / Social Systems Engineering Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to understand and analyze the development of science and technology and their roles in the society both broadly and concretely
- (B) The ability to understand and analyze economic activities and individuals engaged in such activities including their behavioral principles, ethical norms, and legal systems in a comprehensive manner
- (C) The ability to understand basic principles of new values created by today's engineering, which are tangible or intangible, and apply them to solve various problems
- (D) The ability to understand management theories of various organizations such as enterprises, municipalities, and local communities and to conceptualize and develop both specific and workable measures to improve the welfare of mankind
- (E) The ability to identify potential societal issues and propose specific solutions, and the ability to gain an understanding of the people in order to implement these solutions by building and operating organizations needed

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes	
1 (A)	自然科学総論 I・III・IV・V (*I, II, III, IV, Vのうち1科目) / General Natural Sciences I・III・IV・V (*Choose one)	必修/R	1	99	46	3単位/3	他専攻開設 / in other Depts	
	先端科学技術総論 / Special Topics in Advanced Science and Technology	必修/R	1	99	46		課程共通科目(a)/M(a)	
	技術・社会システム工学総論 / Science, Technology and Society, General	必修/R	1	16	36			
	修王のためのキャリアマネジメントセミナー / Career Management Seminar for Postgraduate students	選択/E	2	74	37		課程共通科目(a)/M(a)	
5 (B)	技術経営戦略特論 / Technology and Innovation Mangement	選択必修/ReqE	2	16, 37	37	10単位以上/ 10 or more		
	組織行動特論 / Lecture: Organizational Behavior	選択必修/ReqE	2	37	37			
	リスクマネジメント特論 / Risk Management	選択必修/ReqE	2	16, 49	37			
	産業技術政策特論 / Advanced Industrial Technology Policy	選択必修/ReqE	2	16	37			
9 (D)	生産マネジメント特論 / Advanced Production Management	選択必修/ReqE	2	37, 49	37			
	会計管理特論 / Business Accounting	選択必修/ReqE	2	37	37			
	プロジェクトマネジメント演習 / Course Work on Project Management	選択必修/ReqE	2	37, 49	47			
	ブランディング特論 / Branding	選択必修/ReqE	2	37	37			
13 (E)	リサーチデザイン演習 / Course Work on Research Design	必修/R	1	99	46		11単位/11	
	技術経営プロジェクト I / Project Research in Social Systems Engineering I	必修/R	4	77, 99	57			
	技術経営プロジェクト II / Project Research in Social Systems Engineering II	必修/R	4	77	57			
	ビジネス英語 / Business English	必修/R	2	70	57			
17 (A) (C)	他コース専門科目 / course(s) in other Courses	選択必修/ReqE	8以上/ 8 or more	-	-		*	
18 (A) (B) (C)	組織行動演習 / Seminar: Organizational Behavior	選択/E	2	37, 38	47	他専攻科目 2単位以上 14単位以上/ 14 or more incl. 2 or more in other Depts	(企業経営・起業)	
19	中小企業論特論 / Lecture: Small Medium-size Enterprise	選択/E	2	37	46		(企業経営・起業)	
20	中小企業論演習 / Seminar: Small Medium-size Enterprise	選択/E	2	37	46		(企業経営・起業)	
21	経営戦略特論 / Lecture: Strategic Management	選択/E	2	37	46		(企業経営・起業)	
22	経営戦略演習 / Seminar: Strategic Management	選択/E	2	37	47		(企業経営・起業)	
23	経営組織特論 / Lecture: Organization Theory	選択/E	2	37	46		(企業経営・起業)	
24	経営組織演習 / Seminar: Organization Theory	選択/E	2	37	47		(企業経営・起業)	
25	公共経済学特論 / Lecture: Public Economics	選択/E	2	36	46		(政策立案・公共経営)	
26	公共経済学演習 / Seminar: Public Economics	選択/E	2	36	47		(政策立案・公共経営)	
27	公共経営特論 / Lecture: Public Management	選択/E	2	37	46		(政策立案・公共経営)	
28	公共経営演習 / Seminar: Public Management	選択/E	2	37	47		(政策立案・公共経営)	
29	NPO論特論 / Lecture: Studies in Non Profit Organization	選択/E	2	37	46		(政策立案・公共経営)	
30	NPO論演習 / Seminar: Studies in Non Profit Organization	選択/E	2	37	47		(政策立案・公共経営)	
31	地方財政特論 / Lecture: Local Public Finance	選択/E	2	36	46		(政策立案・公共経営)	
32	地方財政演習 / Seminar: Local Public Finance	選択/E	2	36	47		(政策立案・公共経営)	
33	医療経営特論 / Lecture: Health Care Management	選択/E	2	37	46		(政策立案・公共経営)	
34	医療経営演習 / Seminar: Health Care Management	選択/E	2	37	46		(政策立案・公共経営)	
35	マクロ経済学特論 / Lecture: Macroeconomics	選択/E	2	36	46		(政策立案・公共経営)	
36	マクロ経済学演習 / Seminar: Macroeconomics	選択/E	2	36	47		(政策立案・公共経営)	
37	組織の経済学特論 / Lecture: Organizational Economics	選択/E	2	36	46		(政策立案・公共経営)	
38	組織の経済学演習 / Seminar: Organizational Economics	選択/E	2	36	47		(政策立案・公共経営)	
39	財務会計特論 / Lecture: Financial Accounting	選択/E	2	36	46		(企業経営・起業)	
40	財務会計演習 / Seminar: Financial Accounting	選択/E	2	36	47		(企業経営・起業)	
41	管理会計特論 / Lecture: Management Accounting	選択/E	2	37	46		(企業経営・起業)	
42	管理会計演習 / Seminar: Management Accounting	選択/E	2	37	47		(企業経営・起業)	
43	国際会計特論 / Lecture: International Accounting	選択/E	2	36	46		(企業経営・起業)	
44	国際会計演習 / Seminar: International Accounting	選択/E	2	36	47		(企業経営・起業)	
45	租税理論特論 / Lecture: Tax Theory	選択/E	2	36	46		(企業経営・起業)	
46	租税理論演習 / Seminar: Tax Theory	選択/E	2	36	47	(企業経営・起業)		

必修14単位、選択必修18単位以上、計38単位以上
Credit Required: Total 38 credits or more including 14 credits in required courses and 18 credits or more in required elective courses

【備考】 「所属専攻科目」には課程共通科目 (a) を含む。

※「他コース専門科目」には、材料生産システム専攻の他コースで開設する科目および他専攻で開設する科目を含む。

【Note】 M(a) indicates Master's common courses. They are included in "Department courses."

※"Courses in other Courses" include courses in other Departments of the Department of Advanced Materials Science and Technology and courses in other Departments

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

Semester	(A)	(B)	(C)	(D)	(E)
1期	自然科学総論, 先端科学技術総論	組織行動特論, リスクマネジメント特論	研究科他コース科目 または 経営系科目群	プロジェクトマネジメント演習	リサーチデザイン演習
2期	技術・社会システム工学総論			ブランディング特論	技術経営プロジェクト I
3期		技術経営戦略特論		会計管理特論, 生産マネジメント特論	
4期		産業技術政策特論			ビジネス英語 技術経営プロジェクト II

○電気情報工学専攻（博士前期課程）／Department of Electrical and Information Engineering (Master's Programs)

情報工学コース（M）／Information Engineering Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) Development of the following attitudes and positions
 (A-1) An awareness of ethics and responsibilities as a technician, and the ability to actively contribute to local communities and the world
 (A-2) The ability to autonomously and continuously engage in study and problem solving in order to develop new understanding and value through research and implementation
 (A-3) Broad, interdisciplinary academic attainments across multiple fields, and the ability to think by tying together diverse ideas
- (B) Development of the following general-purpose abilities
 (B-1) The ability to acquire new concepts and perspectives through research and implementation
 (B-2) The ability to model and abstract objects through logical thinking
 (B-3) The ability to discover and solve problems. Also, the ability to think systematically and critically in order to solve problems
 (B-4) The ability to understand papers, manuals, etc. in the fields of science and technology written in English, and the ability to write accurate technical documents
 (B-5) The ability to give presentations to experts based on data
 (B-6) The ability to read, write and communicate in English well enough to work internationally in the specialization
 (B-7) The abilities to accurately convey one's ideas in a discussion and to properly understand the assertions of others; Also, the ability to work smoothly with others with a highly developed sense of ethics
- (C) Development of the following field-specific abilities
 (C-1) The advanced ability to design information structures, design and express calculations, and process large amounts of data
 (C-2) The advanced ability to make deductions based on formal models, as well as create and operate information-handling machinery
 (C-3) The advanced ability to understand and express the organizations and structures of systems
 (C-4) The ability to create information-handling systems in society and the advanced ability to operate these
 (C-5) The advanced ability to manage the creation of complex systems
 (C-6) The advanced ability to discover and solve information-related problems in society
 (C-7) The advanced ability to actively participate in an information-based society with awareness of general information principles
 (C-8) The advanced ability to detect and comprehend the significance and danger that information presents to individuals and society
 (C-9) The advanced ability to utilize information in compliance with societal rules
- (D) Development of the following knowledge and understanding
 (D-1) A mastery of advanced theories relating to the natural sciences such as mathematics, physics, etc.
 (D-2) A mastery of the advanced contents of general information principles
 (D-3) A mastery of the advanced contents of principles of computer-processed information
 (D-4) A mastery of advanced knowledge of computer software and hardware
 (D-5) A mastery of advanced technologies for constructing and utilizing information-handling systems in society

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req. for Degree	備考 Notes	
1	自然科学総論 I・II・IV・V(*いずれか1科目) ／General Natural Sciences I・II・IV・V (*Choose one)	必修/R	1	99	46	1単位/1	他専攻開設/in other Depts	
2	他専攻科目又は課程共通科目（インターンシップ、自然科学総論及びデータサイエンス概論を除く）/course(s) in other Depts or Master's common course(s) (excl. Internship, General Natural Sciences, & Introduction to Data Science)	選択必修/ReqE	2	-	-	2単位以上/ 2 or more		
3	情報工学セミナー I / Seminar in Information Engineering I	必修/R	2	49	57	7 単位 / 7		
4	情報工学セミナー II / Seminar in Information Engineering II	必修/R	2	49	57			
5	情報工学発表演習（中間発表）/ Presentation Exercise in Information Engineering	必修/R	1	49.77	56			
6	情報工学研究発表（外部発表）/ Presentation in Information Engineering	必修/R	2	49.77	57			
7	情報工学特定研究 I / Project Research in Information Engineering I	必修/R	6	49.77	57		14 単位 / 14	
8	情報工学特定研究 II / Project Research in Information Engineering II	必修/R	6	49.77	57			
9	情報工文学文献詳読 I / Literature Reading in Information Engineering I	必修/R	2	49	56			
10	情報工文学文献詳読 II / Literature Reading in Information Engineering II	選択/E	2	49	56			
11	移動情報ネットワーク特論 / Advanced Mobile Information Networks	選択/E	2	49	56		35 単位 以上 / 35 or more	
12	波動情報特論 / Radar Engineering	選択/E	2	49	56			
13	ワイヤレス情報通信特論 / Advanced Wireless Communications	選択/E	2	49	56			
14	電磁波工学特論 / Applied Electromagnetic Theory	選択/E	2	49	56			
15	電波伝搬シミュレーション特別演習 / Advanced Computational Electromagnetics	選択/E	2	49	56			
16	空間信号処理特論 / Spatial Signal Processing	選択/E	2	49	56			
17	データマネジメント工学 / Data Management Engineering	選択/E	2	49	56			
18	組合せアルゴリズム特論 / Combinatorial Algorithms	選択/E	2	10	56			
19	メディア情報処理特論 / Media Informatics	選択/E	2	49	56			
20	応用情報システム特論 / Applied Information System	選択/E	2	49	56			
21	人工知能特論 / Topics in Artificial Intelligence	選択/E	2	10	56			
22	プロジェクトマネジメント / Project management	選択/E	1	49	56			
23	無線アクセス制御特論 / Wireless LAN access control	選択/E	1	49	56			
24	ゲノム情報解析概論 / Genome informatics	選択/E	2	49	56			
25	サービス品質特論 / Special Topics in Quality of service	選択/E	2	49	56			
26	計算論理学 / Computational Logic	選択/E	2	10	56			
27	機械学習と統計数理工学 / Machine Learning and Applied Mathematical Statistics	選択/E	2	49	56	more		
28	環境センシング特論 / Sensing Technology for an Improved Living Environment	選択/E	2	49	47	2021年度新設 / New course		
29	生体・環境電磁特論 / Biological Electromagnetic Compatibility	選択/E	2	49	47	2021年度新設 / New course		
30	移動支援工学特論 / Advanced Move aided engineering	選択/E	2	49	47	2021年度新設 / New course		
31	計算知能特論 / Advanced Computational Intelligence	選択/E	2	10	47	2021年度新設 / New course		
32	ソフトウェア構成論特論 / Software Construction	選択/E	2	49	56	2021年度新設 / New course		
33	データサイエンス概論 / Introduction to Data Science	選択/E	2	10.49	36	課程共通科目/ Master's common course		
34	応用代数学特論 / Applied Algebra	選択/E	2	49	56			
35	応用解析学特論 / Applied Mathematical Analysis	選択/E	2	49	56			
36	数理工学特論 / Advanced Engineering Mathematics	選択/E	2	49	56			
37	応用微分方程式特論 / Applied differential equation	選択/E	2	49	56			
38	情報数理工学 / Information Science	選択/E	2	49	56			
39	所属専攻科目及びインターンシップ（課程共通科目）/ Dept course(s) & Internships (Master's common courses)	選択/E	-	-	-			

計38単位以上 / Total: 38 credits or more

【備考/Notes】 「データサイエンス概論」は所属コース科目として取り扱う。 / Introduction to Data Science is treated as a course in the Course.
 「教職実践学校インターンシップ」は修了要件対象外とする。 / School Internship (Teaching Practice) does not count toward the degree.

3. 授業科目履修の流れ

学年	必修科目
1年	情報工学セミナー I, 情報工学特定研究 I, 情報工文学文献詳読 I, 情報工学発表演習（中間発表）
2年	情報工学セミナー II, 情報工学特定研究 II, 情報工学研究発表（外部発表）

電気電子工学コース (M) / Electrical and Electronic Engineering Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity, an awareness of one's responsibilities, and the ability to understand the relationship between electrical and electronic engineering and society
- (B) The ability to understand and apply fundamental theories and technologies relating to electrical and electronic engineering, the natural sciences, and information technology
- (B-1) The ability to understand and apply the fundamentals of the fields of electrical energy and electronics
- (B-2) The ability to understand and apply the fundamentals of signal processing, telecommunications systems, optical and measurement control, and applied optics
- (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(A) (B)	自然科学総論 I・II・IV・V (*いずれか1科目) /General Natural Sciences I・II・IV・V (*Choose one)	必修/R	1	99	46	9単位 以上/ 9 or more	他専攻開設 / in other Depts
	電気電子工学セミナー I / Seminar in Electrical and Electronic Engineering I	必修/R	2	51	57		
	電気電子工学セミナー II / Seminar in Electrical and Electronic Engineering II	必修/R	2	51	57		
	電気電子工学文献詳読 I / Literature Reading in Electrical and Electronic Engineering I	必修/R	2	51	56		
	電気電子工学文献詳読 II / Literature Reading in Electrical and Electronic Engineering II	選択/E	2	51	56		
	アドバンステクノロジー / Advanced Technology	選択/E	2	51	56		
	企業・研究機関の研修・見学 / Tour/Visit to Businesses and Research Institutes	選択/E	1	74	56		
	修士のためのキャリアマネジメントセミナー / Career Management Seminar for Postgraduate students	選択/E	2	74	37		
	他専攻科目 / course(s) in other Depts	必修/R	2	-	-		他専攻 / other Depts
(B-1)	プラズマ物性特論 / Special Topics in Plasma properties	選択/E	2	51	57	2単位 以上/ 2 or more	
	プラズマ応用工学 / Plasma Science and Technology	選択/E	2	51	47		
	電子材料物性特論 / Advanced Lecture on Electronic Materials	選択/E	2	51	57		
	電子機器特論 / Advanced lecture on Electronic Apparatus	選択/E	2	51	57		
	高電圧大電流工学特論 / High voltage and large current engineering	選択/E	2	51	57		
	応用超伝導工学 / Superconductor Science and Engineering	選択/E	2	51	57		
	光エレクトロニクス特論 / Optoelectronics	選択/E	2	51	57		
	薄膜工学特論 / Thin Film Technology	選択/E	2	51	57		
	電子・光機能性材料特論 / Advanced lecture on electronic and optical functional materials	選択/E	2	51	57		
(B-2)	有機エレクトロニクス特論 / Organic Electronics	選択/E	2	51	57	2単位 以上/ 2 or more	
	電子情報通信特論 / Selected Topics in Electronics Information and Communications	選択/E	2	51	57		
	デバイス・センサ特論 / Advanced Electronic Devices and Sensors	選択/E	2	51	57		
	光コヒーレンス工学 / Optical coherence technology	選択/E	2	51	57		
	光システム機器特論 / Advanced lecture on optical system	選択/E	2	51	57		
	電子光デバイス特論 / Advanced Electrical and Optical Devices	選択/E	2	51	47		
	デジタル無線伝送工学 / Digital Wireless Transmission Systems	選択/E	2	51	56		
画像処理特論 / Advanced Topics in Image processing	選択/E	2	51	56			
(C)	企業における生産・開発 I / Lecture on Manufacturing and Development Research I	選択/E	1	74	47	15単位 以上/ 15 or more	課程共通科目(a) / M(a)
	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a) / M(a)
	先端科学技術総論 / Special Topics in Advanced Science and Technology	必修/R	1	99	46		課程共通科目(a) / M(a)
	電気電子工学特定研究 I / Project Research in Electrical and Electronic Engineering I	必修/R	6	51,77	57		
	電気電子工学特定研究 II / Project Research in Electrical and Electronic Engineering II	必修/R	6	51,77	57		
	電気電子工学研究発表演習 (中間発表) / Presentation Exercise in Electrical and Electronic Engineering	必修/R	1	51,77	56		
	電気電子工学研究発表 (外部発表) / Presentation in Electrical and Electronic Engineering	必修/R	2	51,77	57		
所属専攻科目 / Department course(s)	選択/E	-	-	-			

必修24単位, 計38単位以上 / Total: 38 credits or more including 24 credits in required courses

【備考】 課程共通科目(a)は、所属専攻の科目として取り扱う。

(その他の課程共通科目 (他専攻で開設する自然科学総論を除く) は修了要件対象外とする。)
(「教職実践学校インターンシップ」は修了要件対象外とする。)

【Notes】 M(a) indicates Master's common courses(a). They are treated as Department courses.

(Master's common courses not listed above (except General Natural Sciences in other Departments) do not count toward the degree.)
(School Internship (Teaching Practice) does not count toward the degree.)

3. 授業科目履修の流れ

セメスター	(A)	(B)	(C)
1期	自然科学総論 電気電子工学セミナー I	他専攻科目 電気電子工学文献詳読 I コース / 課程共通科目 (6単位程度)	電気電子工学特定研究 I
2期	電気電子工学セミナー I	コース / 課程共通科目 (4単位程度)	電気電子工学特定研究 I 電気電子工学研究発表演習 (中間発表)
3期	電気電子工学セミナー II	コース / 課程共通科目 (4単位程度)	電気電子工学特定研究 II 電気電子工学研究発表 (外部発表)
4期	電気電子工学セミナー II		電気電子工学特定研究 II

人間支援科学コース（M）／Human Sciences and Assistive Technology Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity, the ability to understand technological support for elderly and disabled individuals in a super aged society, and the ability to make ethical judgements
 (B) The ability to understand fundamental theories and technologies in information, electronic and mechanical engineering, and the ability to apply these in the following fields
 (B-1) The biomedical engineering field as it relates to bio-function sensing and control, body movement analysis, equipment for examining, diagnosing and treating illnesses, technologies and necessary equipment and systems for overcoming and ameliorating disabilities, and interfaces in human/mechanical systems; as well as the medical welfare engineering field, including application of mechatronics aimed at supporting the self-reliance of elderly and disabled individuals, support technologies for nursing care and assistance, control to ensure comfortable lifestyles and working environments, electronic information technologies that will form the basis of high-welfare societies, and modeling and
 (B-2) The lifestyle support science field, including the elucidation of bio-functions, self-reliance support technologies for elderly and disabled individuals based on bio-functions and psychological analyses, universal design in living environments and equipment, optimal provision and management of support services, rehabilitation engineering relating to biomechanics aimed at preventing injuries and evaluating performance in sports, the living environments, home environments and social welfare necessary in realizing a high-welfare society, psychology relating to elderly and disabled individuals aimed at supporting self-realization through societal participation in accordance with one's abilities, and
 (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(A) (C)	自然科学総論 I・II・IV・V (※いずれか1科目) ／General Natural Sciences I・II・IV・V (*Choose one)	必修／R	1	99	46	24単位 以上/ 24 or more	他専攻科目／in other Depts
	人間支援科学特定研究 I／Project Research in Human Science and Assistive Technology I	必修／R	6	56,77	57		
	人間支援科学特定研究 II／Project Research in Human Science and Assistive Technology II	必修／R	6	56,77	57		
	人間支援科学セミナー I／Seminar in Human Science and Assistive Technology I	必修／R	2	56	57		
	人間支援科学セミナー II／Seminar in Human Science and Assistive Technology II	必修／R	2	56	57		
	人間支援科学文献詳読 I／Literature Reading in Human Science and Assistive Technology I	必修／R	2	56	56		
	人間支援科学文献詳読 II／Literature Reading in Human Science and Assistive Technology II	選択／E	2	56	56		
	他専攻科目／course(s) outside the Dept	必修／R	2以上/ 2 or more	-	-		
	課程共通科目 (自然科学総論及びデータサイエンス概論を除く)／course(s) in other Depts or Master's common course(s) (excl. General Natural Sciences and Introduction to Data Science)	選択／E	-	-	-		課程共通科目(b)／M(b)
	人間支援科学研究発表演習 (中間発表) ／Presentation Exercise in Human Sciences and Assistive Technology	必修／R	1	56,77	57		
	人間支援科学研究発表 (外部発表)／Presentation in Human Sciences and Assistive Technology	必修／R	2	56,77	57		
(A)	人間支援科学特別講義 I／Special Lecture on Human Science and Assistive Technology I	選択／E	2	56	57		
	人間支援科学特別講義 II／Special Lecture on Human Science and Assistive Technology II	選択／E	2	56	57		
	人間支援科学特別講義 III／Special Lecture on Human Science and Assistive Technology III	選択／E	1	56	57		
(B-1)	生体情報工学特論／Biomedical Information	選択／E	2	56	47	2021年度新設／New course 課程共通科目 ／Master's common course	
	神経生理工学特論／Neural and Physiological Engineering	選択／E	2	56	47		
	支援システム特論／Assistive System	選択／E	2	56	47		
	分子生体機能工学特論／Molecular Biofunctional Technology	選択／E	2	56	47		
	液体物理学特論／Liquid State Physics	選択／E	2	43	47		
	データサイエンス概論／Introduction to Data Science	選択／E	2	10,49	36		
	人間支援材料特論／Human Assistive Materials	選択／E	2	56	57		
	立体造形特論／Three-dimensional molding theory	選択／E	2	13	37		
	デザイン表現特論／Design Expression theory	選択／E	2	13	37		
	生体生理情報特論／Biological and Physiological Engineering	選択／E	2	56	47		
(B-2)	生体材料工学特論／Biomaterial Engineering	選択／E	2	56	57	(B-1), (B-2)の それぞれから 1科目以上/ 1 or more each in (B-1) and (B-2)	
	スポーツバイオメカニクス論／Sports Biomechanics	選択／E	2	56	57		
	運動生理学特論／Motion Physiology	選択／E	2	56	57		
	コミュニケーション支援特論／Assistive Technology for Communication	選択／E	2	56	47		
	音声聴覚情報処理特論／Speech and Auditory Information Processing	選択／E	2	56	47		
	視覚情報処理特論／Information Processing of Visual Perception	選択／E	2	56	47		
	音楽制作特論／Music Production	選択／E	2	13	37		
	演奏表現特論／Performance Expression	選択／E	2	13	37		
	所属専攻科目／Department course(s)	選択／E	-	-	-		
	必修24単位, 計38単位以上／Total: 38 credits or more including 24 credits or more in required courses						

【備考】 課程共通科目(b)は、他専攻科目（選択）として扱う。
 (必修の「他専攻科目2単位」には含めることができないので注意すること。)
 (「データサイエンス概論」は所属コース科目として取り扱う。)
 (「教職実践学校インターンシップ」は修了要件対象外とする。)

【Notes】 M(b) indicates Master's common courses(b). They are treated as courses in other Departments (electives).
 (Attention: Common Master's courses(b) do not count toward the required two credits in other Department.)
 (Introduction to Data Science is treated as a course in the Course.)
 (School Internship (Teaching Practice) does not count toward the degree.)

3. 必修授業科目履修の流れ

セメスター	(A)	(A) (C)
1期	2科目	自然科学総論, 人間支援科学特定研究 I, 人間支援科学セミナー I
2期	1科目	人間支援科学文献詳読 I
3期	3科目	人間支援科学特定研究 II, 人間支援科学セミナー II, 人間支援科学研究発表演習 (中間発表)
4期	1科目	人間支援科学研究発表 (外部発表)

※2021年度から廃止した科目 「支援機器要素技術」, 「生体・環境電磁波特論」 「移動支援工学特論」 「環境センシング特論」

○生命・食料科学専攻（博士前期課程）／Department of Life and Food Sciences (Master's Programs)

基礎生命科学コース（M）／Life Sciences Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
 (B) The ability to understand and elucidate theories and technologies in fundamental biology and related fields
 (B-1) The ability to understand and elucidate fundamental theories relating to immunity, biomolecules, super-molecules and embryogenesis
 (B-2) The ability to understand and elucidate fundamental theories relating to the structures and functions of organelle, genetics, evolutionary development, and marine organisms
 (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ・Ⅴ（いずれか1科目） ／General Natural Sciences I・II・III・IV・V (Choose one)	必修/R	1	99	46	1単位/1	他専攻開設／in other Depts
2	基礎生命科学セミナー／Life Science Seminar	選択/E	1	57	57		
3	(他専攻科目／course(s) in other Depts)	必修/R	2	-	-		
4	(生命・食料科学専攻内の他コース開設科目 ／course(s) in other Courses in the Department of Life and Food Sciences)	選択/E	-	-	-		
5	先端科学技術総論／Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(a)／M(a)
6	プロジェクト研究特別概説／Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a)／M(a)
7	企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(b)／M(b)
8	修士のためのインターンシップ／Internship for master's courses	選択/E	1	74	47		課程共通科目(b)／M(b)
9	企業・研究機関の研修・見学／Tour/Visit to Businesses and Research Institutes	選択/E	1	74	56		課程共通科目(b)／M(b)
10	薬品安全管理技術／Safety Management of Chemicals	選択/E	2	46	46		課程共通科目(a)／M(a)
11	大型機器分析技術／Techniques in instrumental analysis	選択/E	2	99	46		課程共通科目(a)／M(a)
12	知的財産権・技術経営論Ⅰ ／Intellectual property rights and theory of Management Technology I	選択/E	1	99	46		課程共通科目(b)／M(b)
13	知的財産権・技術経営論Ⅱ ／Intellectual property rights and theory of Management Technology II	選択/E	1	99	46		課程共通科目(b)／M(b)
14	インターンシップ／Internship	選択/E	1	74	46		課程共通科目(b)／M(b)
15	ワーク・ライフ・バランス／Work・Life・Balance	選択/E	1	74	46		所属専攻 (他コースを含む) 科目
16	科学技術英語Ⅰ／English for Science and Technology Majors I	選択/E	1	70	46		課程共通科目(b)／M(b)
17	科学技術英語Ⅱ／English for Science and Technology Majors II	選択/E	1	70	46		課程共通科目(b)／M(b)
18	教職実践学校インターンシップ／School Internship (Teaching Practice)	選択/E	4	-	-		10単位以上 (注2)／
19	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択/E	2	74	37		2 or more in other Depts (Note 1)
20	先端的農業技術論／Leading-Edge Agriculture Technology	選択/E	1	64	47		
21	食品加工技術論／Food Processing Technology	選択/E	1	61	47		
22	食の安全・安心論／Food Safety and Security	選択/E	1	61	47		10 or more in the Dept (incl. other Courses)
23	先端臨海実習／Advanced marine course	選択/E	2	57	47		(Note 2)
24	免疫細胞生物学／Cellular Immunobiology	選択/E	2	57	57		
25	遺伝子工学概論／Topics in Gene Engineering	選択/E	2	57	57		
26	糖鎖生物学／Glycobiology	選択/E	2	57	57		
27	構造生物学特論／Advanced structural biology	選択/E	2	57	57		
28	胚発生学／Animal Embryology	選択/E	2	57	47		
29	植物生理学特論Ⅰ／Advanced Plant Physiology I	選択/E	2	57	47		
30	植物生理学特論Ⅱ／Advanced Plant Physiology II	選択/E	2	57	47		
31	植物生理学特論Ⅲ／Advanced Plant Physiology III	選択/E	2	57	47		
32	神経内分泌学／Neuroendocrinology	選択/E	2	57	47		
33	植物分子遺伝学特論Ⅰ／Advanced Plant Molecular Genetics I	選択/E	2	57	56		
34	分子細胞生理学特論／Molecular and Cellular Physiology Advanced Course	選択/E	2	57	57		
35	進化発生生物学特論Ⅰ／Evolutionary Developmental Biology I	選択/E	2	57	56		
36	水圏生物学／Aquatic Biology	選択/E	2	57	58		
37	生命・食料科学特定研究BⅠ／Graduate Study in Life and Food Science BⅠ	必修/R	4	57,61,77	57		
38	生命・食料科学特定研究BⅡ／Graduate Study in Life and Food Science BⅡ	必修/R	4	57,61,77	57		
39	生命・食料科学セミナーBⅠ／Seminar in Life and Food Science BⅠ	必修/R	2	57,61	57		
40	生命・食料科学セミナーBⅡ／Seminar in Life and Food Science BⅡ	必修/R	2	57,61	57		
41	文献詳読Ⅰ／Seminar in Current Topics I	必修/R	3	60,61,57	56		
42	文献詳読Ⅱ／Seminar in Current Topics II	必修/R	3	60,61,57	57		
43	研究発表演習(中間発表)／Presentation Practice	必修/R	1	77	56		
44	研究発表／Presentation in Scientific Meeting	選択/E	1	57,77	57		
45	英語論文作成・発表演習／Scientific Writing and Presentation in English	選択/E	1	70	57		19単位以上(必修 科目含む)／ 19 or more (incl. required courses)
46	実践型食づくりプロジェクト／Project of Practical Food Manufacturing	選択/E	2	61	57		
47	企画実践型インターンシップ／Internship Practice with Designed Project	選択/E	1	61,74	57		
48	食づくり国際インターンシップ／International Internship for Food Production	選択/E	1	61,74	57		
49	グローバル農力(短期)／Global Agriculture and Food Science (Short Program)	選択/E	2	60	57		
50	グローバル農力国際インターンシップ(中期) ／International Internship in Agriculture and Food Science (Intermediate Program)	選択/E	1	60	57		
51	グローバル農力国際特別研究(中期) ／International Graduate Study in Agriculture and Food Science (Intermediate Program)	選択/E	2	60	57		
52	グローバル農力国際インターンシップ(長期) ／International Internship in Agriculture and Food Science (Long Program)	選択/E	2	60	57		
53	グローバル農力国際特別研究(長期) ／International Graduate Study in Agriculture and Food Science (Long Program)	選択/E	4	60	57		

【備考】(注1) 課程共通科目(b)は、他専攻科目(選択)として取り扱う。(必修の「他専攻科目2単位」には含めることができないので注意すること。)
 (注2) 「所属専攻の専門科目」には、課程共通科目(a)を含む。

【Notes】(Note 1) M(b) indicates Master's common courses(b). They are treated as courses in other Departments (electives).
 (Attention: Master's common courses(b) may not count toward the required two credits in other Departments.)
 (Note 2) M(a), or Master's common courses(a), are included in Department courses.

3. 必修科目履修の流れ

年次	必修科目
1年次	自然科学総論, 他専攻の専門科目, 生命・食料科学特定研究BⅠ, 生命・食料科学セミナーBⅠ, 文献詳読Ⅰ, 研究発表演習(中間発表)
2年次	生命・食料科学特定研究BⅡ, 生命・食料科学セミナーBⅡ, 文献詳読Ⅱ

4. 食づくり実践型農と食のスペシャリスト養成プログラム
 プログラムの詳細は、●ページを参照してください。

応用生命・食品科学コース（M）／Applied Life and Food Sciences Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies of applicable fields
- (B-1) An understanding of genomic science, plant genetics, physiology and biochemistry, molecular biology, and cell biology, and the ability to apply these in research aimed at the creation of useful plants and high-quality, high-yield
- (B-2) An understanding of microbiology, bio-organic chemistry, molecular biology, genetic engineering, and genomic science, and the ability to apply these in research aimed at advanced application of useful substances produced by
- (B-3) An understanding of theories and technologies relating to the base ingredients, processing, production, safety, nutrition and functions of food, and the ability to apply these in research aimed at elucidating life phenomena relating to
- (B-4) An understanding of biochemistry, microbiology, soil science and wood chemistry at levels appropriate to the field of resource utilization science, and the ability to apply these in research aimed at elucidating life phenomena relating to
- (C) The ability to communicate academically. The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes	
1 (A)	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ（いずれか1科目） General Natural Sciences I・II・III・IV (Choose one)	必修/R	1	99	46	1単位/1	他専攻開設／in other Depts	
2	応用生命・食品科学概論／Outline in Applied Life and Food Sciences	選択/E	2	60	46	2単位以上/ 2 or more	2021年度新設／New course 2021年度新設／New course	
3	応用生命・食品科学セミナーⅠ／Seminar I in Applied Life and Food Sciences	選択/E	1	61	57			
4	応用生命・食品科学セミナーⅡ／Seminar II in Applied Life and Food Sciences	選択/E	1	61	57			
5	応用生命・食品科学セミナーⅢ／Seminar III in Applied Life and Food Sciences	選択/E	1	61	57			
6	応用生命・食品科学セミナーⅣ／Seminar IV in Applied Life and Food Sciences	選択/E	1	61	57			
7 (B)	バイオインフォマティクス概論／Bioinformatics	選択/E	2	61	57			
8	<他専攻科目及び課程共通科目（自然科学総論を除く） /course(s) in other Depts & Master's common course(s) (excl. General Natural Sciences)>	必修/R	2	-	-			2単位相当分の科目（注2） /course(s) worth two credits (Note 2)
9	<当該専攻内の他コースで開講する科目/courses in other Courses in the Dept>	選択/E	-	-	-			
10	食品加工技術論／Food Processing Technology	選択/E	1	61	47			注1/Note 1
11	食の安全・安心論／Food Safety and Security	選択/E	1	61	47			
12	植物分子生物学／Advanced plant molecular biology	選択/E	2	61	57	課程認定 (教員免許状) に対応して 10単位以上/ 10 or more		
13	植物生化学／Plant Biochemistry	選択/E	2	61	57			
14	植物栄養生理化学／Plant Nutrition and Physiology	選択/E	2	61	57			
15	植物ゲノム科学／Advanced plant genome	選択/E	2	61	57			
16	植物バイオコントロール学／Advanced Plant Bio-control	選択/E	2	61	57			
17	植物環境応答学特論Ⅰ／Topics in environmental responses of plants I	選択/E	2	61	57			
18	植物細胞工学特論／Advanced in Plant Cell Technology	選択/E	2	60	47			2021年度新設／New course
19	微生物機能学／Microbial Functions	選択/E	2	61	57			
20 (B-2)	微生物分子遺伝学／Microbial Molecular Genetics	選択/E	2	61	57			
21	微生物天然物化学／Natural products chemistry of microorganisms	選択/E	2	61	57			
22	動物栄養生理学／Animal nutrition and physiology	選択/E	2	61.66	57	課程認定 (教員免許状) に対応して 10単位以上/ 10 or more		
23	米利用科学論／Science of rice utilization	選択/E	2	61	57			
24	食品評価学／Advanced Food Evaluation	選択/E	2	61.66	57			
25	食品生化学／Food Biochemistry	選択/E	2	61	57			
26	食品分子機能学／Molecular Function of Food Constituents	選択/E	2	61	57			
27	食品工学概論／Introduction of Food Technology	選択/E	2	61	57			
28	醸造学特論Ⅰ／Advanced Zymurgy I	選択/E	2	61	57			2021年度新設／New course
29	食品・農業情報工学特論／Advanced Food & Agricultural Informatics	選択/E	2	65	46			2021年度新設／New course
30 (B-4)	環境土壌学／Environmental Soil Science	選択/E	2	61	57			
31	木質成分化学／Wood chemistry	選択/E	2	61	57			
32	生命・食料科学特定研究AⅠ／Graduate Study in Life and Food Science AⅠ	選択必修/ ReqE	4	60.61,77	57	課程認定 (教員免許状) に対応して 19単位以上/ 19 or more	教員免許（農業）／Teach Cert (Agr) 教員免許（理科）／Teach Cert (Sci)	
33	生命・食料科学特定研究BⅠ／Graduate Study in Life and Food Science BⅠ	選択必修/ ReqE	4	57.61,77	57			
34	生命・食料科学特定研究AⅡ／Graduate Study in Life and Food Science AⅡ	選択必修/ ReqE	4	60.61,77	57			
35	生命・食料科学特定研究BⅡ／Graduate Study in Life and Food Science BⅡ	選択必修/ ReqE	4	57.61,77	57			
36	生命・食料科学セミナーAⅠ／Seminar in Life and Food Science AⅠ	選択必修/ ReqE	2	60.61	57			
37	生命・食料科学セミナーBⅠ／Seminar in Life and Food Science BⅠ	選択必修/ ReqE	2	57.61	57			
38	生命・食料科学セミナーAⅡ／Seminar in Life and Food Science AⅡ	選択必修/ ReqE	2	60.61	57			
39	生命・食料科学セミナーBⅡ／Seminar in Life and Food Science BⅡ	選択必修/ ReqE	2	57.61	57			
40	文献詳読Ⅰ／Seminar in Current Topics I	必修/R	3	60.61,57	57			
41	文献詳読Ⅱ／Seminar in Current Topics II	必修/R	3	60.61,57	57			
42	実践型食づくりプロジェクト／Project of Practical Food Manufacturing	選択/E	2	61	57	注1/Note 1		
43	企画実践型インターンシップ／Internship Practice with Designed Project	選択/E	1	61.74	57	注1/Note 1		
44	食づくり国際インターンシップ／International Internship for Food Production	選択/E	1	61.74	57	注1/Note 1		
45	グローバル農力（短期）／Global Agriculture and Food Science (Short Program)	選択/E	2	60	57	課程認定 (教員免許状) に対応して 19単位以上/ 19 or more		
46	グローバル農力国際インターンシップ（中期） International Internship in Agriculture and Food Science (Intermediate Program)	選択/E	1	60	57			
47	グローバル農力国際特別研究（中期） International Graduate Study in Agriculture and Food Science (Intermediate Program)	選択/E	2	60	57			
48	グローバル農力国際インターンシップ（長期） International Internship in Agriculture and Food Science (Long Program)	選択/E	2	60	57			
49	グローバル農力国際特別研究（長期） International Graduate Study in Agriculture and Food Science (Long Program)	選択/E	4	60	57			
50	グローバル防災・復興学（短期） Global Disaster Risk Reduction and Recovery (Short Program)	選択/E	2	60	57			
51	グローバル防災・復興国際インターンシップ（中期） International Internship in Disaster Risk Reduction and Recovery (Intermediate Program)	選択/E	1	60	57			
52	グローバル防災・復興国際特別研究（中期） International Graduate Study in Disaster Risk Reduction and Recovery (Intermediate Program)	選択/E	2	60	57			
53	グローバル防災・復興国際インターンシップ（長期） International Internship in Disaster Risk Reduction and Recovery (Long Program)	選択/E	2	60	57			
54	グローバル防災・復興国際特別研究（長期） International Graduate Study in Disaster Risk Reduction and Recovery (Long Program)	選択/E	4	60	57			
55	修士のためのキャリアマネジメントセミナー Career Management Seminar for Postgraduate students	選択/E	2	74	37	課程共通科目／Master's common course 2021年度新設／New course		
56	教職実践学校インターンシップ／School Internship (Teaching Practice)	選択/E	4	-	-	課程共通科目／Master's common course		
57	研究発表演習（中間発表）／Presentation Practice	必修/R	1	77	57			
58 (C)	応用生命・食品科学演習（学会発表）／Exercise in Applied Life and Food Sciences	選択/E	1	61	57			
59	英語論文作成・発表演習／Scientific Writing and Presentation in English	選択/E	1	70	57			
60	所屬専攻科目／Department course(s)	選択/E	-	-	-			
計38単位以上（必修32単位＜他専攻科目及び課程共通科目（自然科学総論を除く）2単位以上含む＞） Total: 38 credits or more (32 credits in required courses <including 2 credits or more in other Departments & Master's common course(s) (except General Natural Sciences)>)								
計38単位以上（必修10単位、選択必修12単位）／Total: 38 credits or more (10 credits in required courses and 12 credits in required elective courses)								

- 【備考】(注1)「食づくり実践型農と食のスペシャリスト養成」プログラムを参照して下さい。
- (注2) 課程共通科目（自然科学総論を除く）は、他専攻の科目として取り扱う。
- 【Notes】(Note 1) Refer to the Agriculture and Food Specialist Training Program section
- (Note 2) Master's common courses (except General Natural Sciences) are treated as courses in other Departments.

3. 必修科目履修の流れ

セメスター	(A)	(B) / (B) (C)	(C)
1期	自然科学総論	生命・食料科学特定研究AⅠ/BⅠ（通年） 生命・食料科学セミナーAⅠ/BⅠ（通年） 文献詳読Ⅰ（通年）、他専攻で開設する科目（※）	
2期			
3期		生命・食料科学特定研究AⅡ/BⅡ（通年） 生命・食料科学セミナーAⅡ/BⅡ（通年） 文献詳読Ⅱ（通年）	研究発表演習（中間発表）
4期			

- 4. 食づくり実践型農と食のスペシャリスト養成プログラム
プログラムの詳細は、●ページを参照してください。
- 5. グローバル農力養成プログラム及びグローバル防災・復興プログラム
プログラムの詳細は、●ページを参照してください。

※2021年度から廃止した科目 「植物分子生命科学概論」、「微生物分子生命科学概論」、「食品・栄養科学概論」、「資源利用科学概論」

生物資源科学コース (M) / Agriculture and Bioresources Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The development of human resources with a profound understanding of life phenomena relating to biological resources, the ability to work as a pioneer and in multifaceted ways to develop new technologies and improve local industries and environments, and who possess the ability to make ethical judgements regarding nature, society, and humanity
 (B) The ability to understand and apply the fundamental theories and technologies of the field concerned
 (B-1) The ability to understand and apply theories relating to the development of sustainable agriculture, the development of agricultural resources that contribute to the revitalization of related industries, food distribution, and agricultural administration and management
 (B-2) The ability to understand and apply theories relating to the cultivation of resource plants such as edible and horticultural crops, plant physiology, ecosystems, genetics and breeding, and plant pathology
 (B-3) The ability to understand and apply theories relating to safe, effective increases in the production of animal protein making use of the genetic diversity as well as the reproductive physiological characteristics, developmental physiological characteristics, and nutritional physiological characteristics of resource animals
 (C) The ability to discover and solve problems, the ability to communicate effectively, including academic conference presentations, and the ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 6 (A)	産業スペシャリスト育成特論 / Training Course for Industrial Specialists	必修/R	1	60,74	36	3単位以上 / 3 or more	
	農業スペシャリスト指向特別演習 / Special Seminar for Agricultural Specialists	選択/E	1	38	46		
	生物資源科学概論 / Introduction to Agriculture and Bioresources	選択/E	2	60,66	46		
	自然科学総論 I・II・III・V (いずれか1科目) / General Natural Sciences I・II・III・V (Choose one)	必修/R	1	99	46		他専攻開設 / in other Depts
	新領域創成論 / Seminar for New Research Area	選択/E	1	60	46		
	課程共通科目 (自然科学総論を除く) / Master's common course(s) (excl. General Natural Sciences)	選択/E	-	-	-		課程共通科目(a)/M(a)
7 8 9 10 (B)	他専攻科目 / course(s) in other Depts	必修/R	2	-	-	2単位以上 / 2 or more	
	先進的農業技術論 / Leading-Edge Agriculture Technology	選択/E	1	64	47		
	食品加工技術論 / Food Processing Technology	選択/E	1	61	47		
	食の安全・安心論 / Food Safety and Security	選択/E	1	61	47		
11 12 13 (B-1)	農業資源開発論 / Agricultural Resource and Rural Development	選択/E	2	64	47	8単位以上 / 8 or more	
	食料流通論 / Food Marketing	選択/E	2	64	47		
	農業生産管理論 / Management of Agricultural Production	選択/E	2	64	47		
14 15 16 17 18 19 20 (B-2)	植物化学調節論 / Plant Chemical Regulation	選択/E	2	60	47	8単位以上 / 8 or more	
	植物細胞工学特論 / Advanced in Plant Cell Technology	選択/E	2	60	47		2021年度名称変更 / New title
	植物分子育種学 / Plant Molecular Breeding	選択/E	2	60	47		
	植物病理学特論 / Advanced Plant Pathology	選択/E	2	60	47		
	園芸植物繁殖特論 / Propagation of Horticultural Plants	選択/E	2	60	47		
	植物病原学特論 / Plant-Pathogen Interactions	選択/E	2	60	47		2021年度新設 / New course
21 22 23 24 (B-3)	動物・植物相互関係論 / Grassland - animal interactions	選択/E	2	66	46	19単位 (必修) / 19 or more (required)	
	動物量の遺伝学 / Quantitative genetics in animals	選択/E	2	66	57		
	動物機能形態論 / Animal Functional Morphology	選択/E	2	66	57		
	動物生殖細胞利用論 / Animal Germ Cell Utilization	選択/E	2	60	46		
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 (C)	生命・食料科学特定研究A I / Graduate Study in Life and Food Science A I	必修/R	4	60,61,77	57	19単位 (必修) / 19 or more (required)	
	生命・食料科学特定研究A II / Graduate Study in Life and Food Science A II	必修/R	4	60,61,77	57		
	研究発表演習 (中間発表) / Presentation Practice	必修/R	1	77	56		
	生命・食料科学セミナーA I / Seminar in Life and Food Science A I	必修/R	2	60,61	57		
	生命・食料科学セミナーA II / Seminar in Life and Food Science A II	必修/R	2	60,61	57		
	研究発表 / Seminar for Early Bird	選択/E	1	57,77	57		
	文献詳読 I / Seminar in Current Topics I	必修/R	3	60,61,57	56		
	文献詳読 II / Seminar in Current Topics II	必修/R	3	60,61,57	56		
	英語論文作成・発表演習 / Scientific Writing and Presentation in English	選択/E	1	70	57		
	実践型食づくりプロジェクト / Project of Practical Food Manufacturing	選択/E	2	61	57		
	企画実践型インターンシップ / Internship Practice with Designed Project	選択/E	1	61,74	57		
	食づくり国際インターンシップ / International Internship for Food Production	選択/E	1	61,74	57		
	グローバル農力(短期) / Global Agriculture and Food Science (Short Program)	選択/E	2	60	57		
	グローバル農力国際インターンシップ(中期) / International Internship in Agriculture and Food Science (Intermediate Program)	選択/E	1	60	57		
	グローバル農力国際特別研究(中期) / International Graduate Study in Agriculture and Food Science (Intermediate Program)	選択/E	2	60	57		
	グローバル農力国際インターンシップ(長期) / International Internship in Agriculture and Food Science (Long Program)	選択/E	2	60	57		
	グローバル農力国際特別研究(長期) / International Graduate Study in Agriculture and Food Science (Long Program)	選択/E	4	60	57		
	グローバル防災・復興学(短期) / Global Disaster Risk Reduction and Recovery (Short Program)	選択/E	2	60	57		
	グローバル防災・復興国際インターンシップ(中期) / International Internship in Disaster Risk Reduction and Recovery (Intermediate Program)	選択/E	1	60	57		
	グローバル防災・復興国際特別研究(中期) / International Graduate Study in Disaster Risk Reduction and Recovery (Intermediate Program)	選択/E	2	60	57		
	グローバル防災・復興国際インターンシップ(長期) / International Internship in Disaster Risk Reduction and Recovery (Long Program)	選択/E	2	60	57		
	グローバル防災・復興国際特別研究(長期) / International Graduate Study in Disaster Risk Reduction and Recovery (Long Program)	選択/E	4	60	57		
	教職実践学校インターンシップ / School Internship (Teaching Practice)	選択/E	4	-	-		
	所属専攻科目 / Department course(s)	選択/E	-	-	-		
	計38単位以上 (他専攻2単位以上) / Total: 38 credits or more (2 credits or more in courses in other Departments)						

【備考】課程共通科目(a)は、所属専攻の科目として取り扱う。
 【Notes】M(a) indicates Master's common course(a). The course is treated as a Department course.

3. 必修授業科目履修の流れ (コースワーク)

セメスター	(A)	(B-1) (B-2) (B-3)	(C)
1期	自然科学総論 (*1) 産業スペシャリスト育成特論 先端科学技術総論	コースの専門科目 (8単位以上)	生命・食料科学特定研究A I (通年) 生命・食料科学セミナーA I (通年) 文献詳読 I (通年) (*2) 研究発表
2期		他専攻科目 (2単位以上)	生命・食料科学特定研究A II (通年) 生命・食料科学セミナーA II (通年) 文献詳読 II (通年) 研究発表演習 (中間発表)
3期			
4期			

「*1」「*2」はコースワーク。

4. 食づくり実践型農と食のスペシャリスト養成プログラム

プログラムの詳細は、●ページを参照してください。

5. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止または名称変更した科目 「農業生産環境特論」, 「農作物学特論」, 「植物組織培養学特論」

○環境科学専攻（博士前期課程）／Department of Environmental Science and Technology (Master's Programs)

自然システム科学コース（M）／Natural Environmental Science Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies
- (B-1) The ability to understand various problems involving the natural environment on a fundamental level in terms of physics and chemistry, including atoms, molecules, energy, etc.
- (B-2) The ability to understand the mechanisms that form the natural environment and the history of its changes, the ability to understand organisms with a broad perspective from the group level down to the cell level, and the ability to understand the diversity of organisms in an orderly manner
- (C) The ability to discover and solve problems
- (D) The ability to communicate effectively, including academic conference presentations
- (E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ(*いずれか1科目) ／General Natural Sciences I・II・III・IV (*Choose one)	必修／R	1	99	46	5単位以上/ 5 or more	他専攻開設/ in other Depts
	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択／E	2	74	37		課程共通科目(a)／M(a) 2021年度新設／New course
3	自然環境科学／Environmental natural Science	必修／R	2	99	46		課程共通科目(a)／M(a)
4	他専攻科目／course(s) other the Dept	必修／R	2	-	-		
5	企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I	選択／E	1	74	47		
6	プロジェクト研究特別概説／Introduction to University Research Projects	選択／E	1	99	47		
7	先端科学技術総論／Special Topics in Advanced Science and Technology	選択／E	1	99	46		
8	突発災害特論／Advanced topics in catastrophic hazards	選択／E	1	44	46		10単位以上/ 10 or more
9	原子分子物理学Ⅰ／Atomic and Molecular Physics I	選択／E	2	43	46		
10	原子分子物理学Ⅱ／Atomic and Molecular Physics II	選択／E	2	43	46		
11	大気物理学特論Ⅰ／Atmospheric Physics I	選択／E	2	43	46		
12	環境化学要論Ⅰ／Chemistry of the Environment I	選択／E	2	46	46		
13	環境化学要論Ⅱ／Chemistry of the Environment II	選択／E	2	46	46		
14	環境化学要論Ⅲ／Chemistry of the Environment III	選択／E	2	46	46		
15	環境化学要論Ⅳ／Chemistry of the Environment IV	選択／E	2	46	46		
16	大気影響評価学特論／Advanced assessment of atmospheric impacts	選択／E	2	46	36		
17	大気環境科学特論／Advanced atmospheric environment sciences	選択／E	2	46	36		
18	地圏環境論Ⅰ／Environmental Science of Earth Surface I	選択／E	2	44	46	(B-2)	
19	生物形態機能論／Biological Structure and Function	選択／E	2	57	46		
20	生態学要論／Ecological requirements Theory	選択／E	2	57	46		
21	進化生物学特論Ⅰ／Evolutionary Biology I	選択／E	2	57	46		
22	進化生物学特論Ⅱ／Evolutionary Biology II	選択／E	2	57	46		
23	進化生物学特論Ⅳ／Evolutionary Biology IV	選択／E	2	57	46		
24	生態学特論Ⅱ／Ecology II	選択／E	2	57	46		
25	地球システム科学特論／Advanced Earth Systems Science	選択／E	2	44	36		
26	環境科学特定研究Ⅰ／Project Research in Environmental Science and Technology I	必修／R	7	77	57	16単位以上/ 16 or more	
27	環境科学特定演習Ⅰ／Specific Seminar in Environmental Science and Technology I	必修／R	4	77	57		
28	研究発表演習Ⅰ（中間発表）／Research Presentation I (Interm.)	必修／R	1	77	57		
29	研究発表演習Ⅰ（学外発表）／Research Presentation I (Congress)	選択／E	1	77	57		
30	環境科学セミナーⅠ／Seminar in Environmental Science and Technology I	必修／R	2	77	57		
31	環境科学総合演習Ⅰ／Synthetic Seminar in Environmental Science and Technology I	必修／R	2	77	57		
32	教職実践学校インターンシップ／School Internship (Teaching Practice)	選択／E	4	-	-	課程共通科目(a)／M(a)	
33	所属専攻科目／Department course(s)	選択／E	-	-	-		

必修21単位、選択必修10単位以上修得のうえ、合計38単位以上修得のこと。
Total: 38 credits or more including 21 credits in required courses and 10 credits or more in required elective courses

【備考】 課程共通科目(a)は、所属専攻の科目として取り扱う。
(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)

【Notes】 M(a) indicates Master's common courses(a). They are treated as Department courses.
(Other Master's common courses (except General Natural Sciences offered in other Departments) do not count toward the degree.)

3. 必修授業科目履修の流れ（目安）

セメスター	(A)	(B)	(C) (D) (E)
1期	自然科学総論	他専攻科目(1科目以上) コース専門科目(2科目以上)	環境科学 セミナーⅠ
2期		コース専門科目(2科目以上)	環境科学 総合演習Ⅰ
3期		コース専門科目(1科目以上)	環境科学 特定研究Ⅰ
4期			環境科学 特定演習Ⅰ

※2021年度から廃止または削除した科目 「固体構造論」、「希少生物学特論」、「大気物理学特論Ⅱ」、「地圏環境論Ⅱ」

流域環境学コース (M) / Environmental Science for Agriculture and Forestry Course (M)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies
- (B-1) The ability to elucidate the functions and structures of forest ecosystems from the perspective of biodiversity, and the ability to apply this knowledge in forest management
- (B-2) The ability to elucidate the interaction between forested areas and water cycle functions, and the ability to apply this in preservative management technologies for the natural environment with a focus on
- (B-3) The ability to understand forest monitoring and how to measure and utilize forest biomass, which is a reusable circulating resource, and the ability to apply these in sustainable usage plans for forest
- (B-4) The ability to plan and manage production environments in rural areas, living environments and natural environments in a unified manner, and the ability to understand and apply technologies aimed at
- (B-5) The ability to understand and apply technologies for using agricultural machinery as well as systemization and process control methods for agricultural production processes
- (B-6) The ability to understand and elucidate water cycle changes in river basins accompanying climate change, in particular falling and melting snow, and their effects on outflow
- (B-7) The ability to survey and elucidate ecosystem changes accompanying global warming, and the ability to conduct future predictions and investigate countermeasures
- (C) The ability to discover and solve problems
- (D) The ability to communicate effectively, including academic conference presentations
- (E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(A) (B)	自然科学総論 I・II・III・IV(*いずれか1科目) / General Natural Sciences I・II・III・IV (*Choose one)	必修/R	1	99	46	5単位 以上/ 5 or more	他専攻開設 / in other Depts
	流域環境学 / Environmental Science and Technology for Agriculture and Forestry	必修/R	2	99	46		
	他専攻科目 / course(s) in other Depts	必修/R	2	-	-		
	企業における生産・開発 I / Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(a) / M(a)
	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a) / M(a)
	先端科学技術総論 / Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(a) / M(a)
	修士のためのインターンシップ / Internship for master's courses	選択/E	1	74	47		課程共通科目(a) / M(a)
	修士のためのキャリアマネジメントセミナー / Career Management Seminar for Postgraduate students	選択/E	2	74	37		課程共通科目(a) / M(a) 2021年度新設 / New course
	教職実践学校インターンシップ / School Internship (Teaching Practice)	選択/E	4	-	-		課程共通科目(a) / M(a)
	突発災害特論 / Advanced topics in catastrophic hazards	選択/E	1	44	46		課程共通科目(a) / M(a)
	流域環境思想論 / Environmental Philosophy on Watershed	選択/E	2	99	37		
(B-1)	森林保全学特論 / Advanced Forest Conservation	選択/E	2	62	46	10単位 以上/ 10 or more	ただし、研究指導委員会が認めた他コースまたは他専攻の科目を、当該分野の専門科目として認定可とする。 / Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B-1) through (B-7).
	野生植物生態学特論 / Topics on plant community dynamics	選択/E	2	57	56		
	自然再生学特論 / Restoration Ecology	選択/E	2	57	56		
	森林遺伝育種学特論 / Advanced Forest Genetics and Tree Breeding	選択/E	2	62	56		
	島嶼生態学特論 / Island Ecology	選択/E	2	57	56		
(B-2)	森林保全工学特論 / Advanced Erosion Control Engineering	選択/E	2	62	56		
(B-3)	森林空間計測学特論 / Advanced Forest Spatial Information	選択/E	2	62	56		
(B-4)	農村計画学特論 / Advanced Rural Planning	選択/E	2	65	46		
	農地工学特論 / Advanced Agricultural Land Improvement Engineering	選択/E	2	65	56		
(B-5)	基礎施設工学特論 / Advanced Course of Embankment Dam Engineering	選択/E	2	65	56		
	生産機械利用学特論 / Advanced Utilization of Farm Machineries	選択/E	2	65	57		
	食品・農業情報工学特論 / Advanced Food & Agricultural Informatics	選択/E	2	65	46		
	生物機械工学特論 / Biological and Mechanical Engineering	選択/E	2	65	57		
(B-6)	精密農業概論 / Introduction to Precision Agriculture	選択/E	2	65	56		
	水文学特論 / Advanced Hydrology	選択/E	2	62	56		
	農業水利調整論 / Advanced Agricultural Water Management	選択/E	2	65	56		
(B-7)	農業環境工学特論 / Agricultural Environmental Engineering	選択/E	2	65	57		
	動物生態学特論 / Advanced Animal Ecology	選択/E	2	57	56		
	大気影響評価学特論 / Advanced assessment of atmospheric impacts	選択/E	2	46	36		
	大気環境科学特論 / Advanced atmospheric environment sciences	選択/E	2	46	36		
	生態系環境学特論 / Advanced Ecosystem Environment	選択/E	2	62	56		
(C) (D) (E)	昆虫生態学特論 / Insect Ecology	選択/E	2	57	56	2021年度新設 / New course	
	環境科学特定研究 II / Project Research in Environmental Science and Technology II	必修/R	7	77	57	16単位 以上/ 16 or more	
	環境科学特定演習 II / Specific Seminar in Environmental Science and Technology II	必修/R	4	77	57		
	研究発表演習 II (中間発表) / Research Presentation II (Interm.)	必修/R	1	77	57		
	研究発表演習 II (学外発表) / Research Presentation II (Congress)	選択/E	1	77	57		
	環境科学セミナー II / Seminar in Environmental Science and Technology II	必修/R	2	77	57		
環境科学総合演習 II / Synthetic Seminar in Environmental Science and Technology II	必修/R	2	77	57			
所属専攻科目 / Department course(s)	選択/E	-	-	-			

修得単位：必修21単位、選択必修10単位以上修得のうえ、合計38単位以上修得のこと。 / Credit Required: Total 38 credits or more including 21 credits in required courses and 10 credits or more in required elective courses

- 【備考】 課程共通科目(a)は、所属専攻の科目として取り扱う。
(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)
- 【Notes】 M(a) indicates Master's common courses(a). They are treated as Department courses.
(Other Master's common courses (except General Natural Sciences offered in other Departments) do not count toward the degree.)

3. 必修授業科目履修の流れ (目安)

セメスター	(B)	(C) (D) (E)
1期	自然科学総論, 共通科目(必修) 他専攻科目(1科目以上), 専門科目(2科目以上)	環境科学セミナー II
2期	専門科目(2科目以上)	環境科学総合演習 II
3期	専門科目(1科目以上)	環境科学特定研究 II
4期		環境科学特定演習 II

4. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止または名称変更した科目 「樹木生態学特論」, 「農業情報工学特論」

社会基盤・建築学コース（社会基盤系）（M）／Architecture and Civil Engineering Course (Civil Engineering Kei) (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to make ethical judgements regarding nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies
- (B-1) A mastery of fundamental theories and technologies aimed at building social infrastructure to protect urban areas and human life from a variety of disasters
- (B-2) A mastery of fundamental theories and technologies aimed at comprehensively handling systems in which natural environments and urban areas co-exist, as well as analyzing, evaluating, planning, and utilizing legal systems and societal environments with an understanding of local environments as historical commodities
- (C) The ability to discover and solve problems
- (D) The ability to communicate effectively, including academic conference presentations
- (E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes		
(A) (B)	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ(*いずれか1科目) ／General Natural Sciences I・II・III・IV (*Choose one)	必修/R	1	99	46	5単位 以上/ 5 or more	他専攻開設 ／in other Depts		
	都市人間環境学／Design for built environment part1	必修/R	2	99	46				
	他専攻科目／course(s) in other Depts	必修/R	2	-	-				
	企業における生産・開発Ⅰ／Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(a)／M(a)		
	プロジェクト研究特別概説／Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a)／M(a)		
	先端科学技術総論／Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(a)／M(a)		
	突発災害特論／Advanced topics in catastrophic hazards	選択/E	1	44	46				
	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択/E	2	74	37		課程共通科目(a)／M(a) 2021年度新設／New course		
(B-1)	計算力学特論／Computational Mechanics	選択/E	2	52	57	10単位 以上/ 10 or more	ただし、研究指導委員会が認めた他コース (※)または他専攻の科目を、当該分野の専門科目として認定可とする。／Courses in other Courses (※) or Depts that are approved by the Kenkyu Shido (Research Advising) Committee count toward (B-1) or (B-2).		
	コンクリート工学特論／Advanced Concrete Technology	選択/E	2	52	57				
	鉄筋コンクリート構造特論／Reinforced Concrete Structure	選択/E	2	53	57				
	鋼コンクリート合成構造特論／Steel Concrete Composite Structure	選択/E	2	53	57				
	環境地盤学特論／Environmental Geology	選択/E	2	52	57				
(B-2)	維持管理工学特論／Advanced Maintenance Engineering	選択/E	2	52	57				
	建築振動学特論／Structural Dynamics	選択/E	2	53	57				
	都市衛生施設工学特論 ／Advanced Lecture on the Management of Urban Water Supply, Sewerage and Solid Waste Disposal	選択/E	2	52	56				
(C) (D) (E)	海岸環境工学特論／Advanced Coastal Engineering	選択/E	2	52	57			16単位 以上/ 16 or more	
	都市環境法特論／Urban planning law	選択/E	2	53	56				
	環境シミュレーション学特論 ／Introduction to Modeling and Simulation for Environmental- and Ecological Problems in Civil Engineer	選択/E	2	52	56				
	環境科学特定研究Ⅲ／Project Research in Environmental Science and Technology III	必修/R	7	77	57				
	環境科学特定演習Ⅲ／Specific Seminar in Environmental Science and Technology III	必修/R	4	77	57				
	研究発表演習Ⅲ（中間発表）／Research Presentation III (Interm.)	必修/R	1	77	57				
	研究発表演習Ⅲ（学外発表）／Research Presentation III (Congress)	選択/E	1	77	57				
環境科学セミナーⅢ／Seminar in Environmental Science and Technology III	必修/R	2	77	57					
環境科学総合演習Ⅲ／Synthetic Seminar in Environmental Science and Technology III	必修/R	2	77	57					
所属専攻科目／Department course(s)	選択/E	-	-	-					

修得単位：必修21単位、選択必修10単位以上修得のうえ、合計38単位以上修得のこと。
Credit Required: Total 38 credits or more including 21 credits in required courses and 10 credits or more in required elective courses

【備考】課程共通科目(a)は、所属専攻の科目として取り扱う。
(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)
※「他コースの科目」には、社会基盤・建築学コースの他分野で開設する科目も含む。

【Notes】M(a) indicates Master's common courses(a). They are treated as Department courses.
(Other Master's common courses (except General Natural Sciences in other Departments) do not count toward the degree.)
※"Courses in other Courses" include courses in other section, Kei, in the Architecture and Civil Engineering Course.

3. 必修授業科目履修の流れ（目安）

セメスター	(B)	(C) (D) (E)
1期	自然科学総論 共通科目(必修) 他専攻科目(1科目以上) 専門科目(2科目以上)	環境科学セミナーⅢ 環境科学総合演習Ⅲ 環境科学特定研究Ⅲ
2期	専門科目(2科目以上)	
3期	専門科目(1科目以上)	
4期		

社会基盤・建築学コース（建築系）（M）／Architecture and Civil Engineering Course (Architecture Kei) (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) Development of the ability to make ethical judgements regarding nature, society and humanity
- (B) Development of the ability to understand and apply the fundamental theories and technologies indicated in Items (B-1) to (B-3) below
 - (B-1) Fundamental theories and technologies aimed at building architectural structures to ensure urban areas, buildings, and human life from a variety of disasters
 - (B-2) Fundamental theories and technologies aimed at planning and designing comfortable, safe living environments with a multifaceted understanding of the spatial functions, environmental properties, and space-forming characteristics of residences, buildings, and urban spaces, which are fundamentally and directly related to human lifestyles, as well as an understanding of their relationship with the environment and human lifestyles
 - (B-3) Fundamental theories and technologies aimed at creating rich, sustainable urban and local environments with an understanding of urban and local areas from a comprehensive perspective that includes social and cultural aspects
- (C) Development of the ability to discover and solve problems
- (D) Development of the ability to communicate effectively, including academic conference presentations
- (E) Development of the ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 6 (A) (B)	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ(*いずれか1科目) ／General Natural Sciences I・II・III・IV (*Choose one)	必修／R	1	99	46	5単位以上／ 5 or more	他専攻開設／in other Depts
	都市人間環境学／Design for built environment part1	必修／R	2	99	46		
	他専攻科目／course(s) in other Depts	必修／R	2	-	-		
	プロジェクト研究特別概説／Introduction to University Research Projects	選択／E	1	99	47		課程共通科目(a)／M(a)
	先端科学技術総論／Special Topics in Advanced Science and Technology	選択／E	1	99	46		課程共通科目(a)／M(a)
	突発災害特論／Advanced topics in catastrophic hazards	選択／E	1	44	46		
7 8 9 10 11 (B-1)	鉄筋コンクリート構造特論／Reinforced Concrete Structure	選択／E	2	53	57	10単位以上／ 10 or more	2021年名称変更／New title
	建築塑性力学／Plastic Theory of Structures	選択／E	2	53	57		
	建築振動学特論／Structural Dynamics	選択／E	2	53	57		
	建築構造設計特論／Advanced Structural Design of Building	選択／E	2	53	57		
	建築構造設計演習／Practice on Structural Design of Building	選択／E	2	53	57		
12 13 14 15 16 17 18 19 20 21 22 (B-2)	建築計画・設計学特論／Architectural Planning and Design	選択／E	2	53	57	16単位以上／ 16 or more	ただし、研究指導委員会が認めた他コース(*)または他専攻の科目を、当該分野の専門科目として認定可とする。／Courses in other Courses(*) or Depts that are approved by the Kenkyu Shido (Research Advising) Committee count toward (B-1) or (B-2).
	住居建築計画特論／Design Theories for housing and homes	選択／E	2	53	57		
	建築設計製図／Architectural Design Studio	選択／E	4	53	57		
	建築環境工学特論／Architectural and Urban Environment	選択／E	2	53	57		
	建築環境計画特論／Advanced Environmental Planning and Design	選択／E	2	53	57		
	建築環境計画演習／Practice on Environmental Planning and Design	選択／E	2	53	57		
	建築設備設計特論／Advanced Environmental System Design of Building	選択／E	2	53	57		
	建築設備設計演習／Practice on Environmental System Design of Building	選択／E	2	53	57		
	建築環境解析学演習／Practical Numerical Simulations on Building Environments	選択／E	2	53	57		
	建築倫理／Architectural Engineer Ethics	選択／E	2	53	57		
23 24 25 (B-3)	風景計画特論／Townscape and Preservation Planning	選択／E	2	53	57		
都市デザイン特論／Urban Design Theory	選択／E	2	53	57			
都市環境法特論／Urban planning law	選択／E	2	53	56			
26 27 28 29 30 31 32 33 34 35 36 37 (C) (D) (E)	環境科学特定研究Ⅲ／Project Research in Environmental Science and Technology III	必修／R	7	77	57	16単位以上／ 16 or more	
	環境科学特定演習Ⅲ／Specific Seminar in Environmental Science and Technology III	必修／R	4	77	57		
	インターンシップ／Internship	選択／E	4	74	57		
	建築インターンシップA／Internship in Architecture A	選択／E	2	53	57		
	建築インターンシップB／Internship in Architecture B	選択／E	4	53	57		
	建築インターンシップC／Internship in Architecture C	選択／E	4	53	57		
	建築設計実習／Practice on Architectural Design	選択／E	4	53	57		
	研究発表演習Ⅲ（中間発表）／Research Presentation III (Intern.)	必修／R	1	77	57		
	研究発表演習Ⅲ（学外発表）／Research Presentation III (Congress)	選択／E	1	77	57		
	環境科学セミナーⅢ／Seminar in Environmental Science and Technology III	必修／R	2	77	57		
	環境科学総合演習Ⅲ／Synthetic Seminar in Environmental Science and Technology III	必修／R	2	77	57		
	修士のためのキャリアマネジメントセミナー ／Career Management Seminar for Postgraduate students	選択／E	2	74	37		課程共通科目(a)／M(a) 2021年度新設／New course
	38 所属専攻科目／Department course(s)		選択／E	-	-		-

修得単位：必修21単位，選択必修10単位以上修得のうえ，合計38単位以上修得のこと。

Credit Required: Total 38 credits or more including 21 credits in required courses and 10 or more credits in required elective courses

【備考】課程共通科目(a)は、所属専攻の科目として取り扱う。（その他の課程共通科目（他専攻で開設する自然科学総論を除く）は修了要件対象外とする。）

※「他コースの科目」には、社会基盤・建築学コースの他分野で開設する科目も含む。

※建築士試験の実務経験に関わる科目の詳細については、別途通知する。

【Notes】M(a) indicates Master's common courses(a). They are treated as Department courses. (Other Master's common courses (except General Natural Sciences in other Departments) do not count toward the degree.)

※*Courses in other Courses* include those in the other section, kei, in the Architecture and Civil Engineering Course.

※※Details on course(s) related to Jitsumu (Practical) Experience required for Kenchikushi (Architect) Examination will be made available separately.

3. 必修授業科目履修の流れ（目安）

セメスター	(B)	(C) (D) (E)
1期	自然科学総論，共通科目(必修)，専門科目 (2科目以上)	環境科学セミナーⅢ 環境科学総合演習Ⅲ 環境科学特定研究Ⅲ
2期	他専攻科目 (1科目以上)，専門科目 (2科目以上)	
3期	専門科目 (1科目以上)	
4期		

※2021年度から名称変更した科目 「鋼コンクリート合成構造特論」

地球科学コース (M) /Earth Science Course (M)

1. コースの教育目標 (人材育成) /Educaional Objectives of the Course (Human Resource Development)
- (A) The ability to make ethical judgements regarding nature, ethics and humanity
 - (B) The ability to understand and apply fundamental theories and technologies
 - (B-1) The ability to elucidate the formative processes of earth substances using isotope petrology and chronological methods
 - (B-2) The ability to elucidate the properties of crust and mantle substances as well as their formations, changes, and interrelations
 - (B-3) The ability to elucidate global environmental changes since the creation of the Earth at various time scales
 - (C) The ability to discover and solve problems
 - (D) The ability to communicate effectively, including academic conference presentations
 - (E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 /Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A) (B)	自然科学総論 I・II・III・IV(*いずれか1科目) /General Natural Sciences I・II・III・IV(*Choose one)	必修/R	1	99	46	1単位/1	他専攻開設 /in other Depts
2	先端科学技術総論 /Special Topics in Advanced Science and Technology	必修/R	1	99	46	1単位/1	課程共通科目(a) /M(a)
3	自然環境科学 /Environmental natural Science	選択/E	2	99	46	2単位以上/ 2 or more	専攻共通 /Dept common course
4	流域環境学 /Environmental Science and Technology for Agriculture and Forestry	選択/E	2	99	46		専攻共通 /Dept common course
5	Earth Science today I	選択/E	1	44	57		専攻共通 /Dept common course
6	Earth Science today II	選択/E	1	44	57		専攻共通 /Dept common course
7	自然災害環境論 /Topics in natural hazard environments	選択/E	1	50,52,53	46		専攻共通 /Dept common course
8	突発災害特論 /Advanced topics in catastrophic hazards	選択/E	1	44	46		専攻共通 /Dept common course
9	他専攻科目 /course(s) other the Dept	必修/R	2	-	-	2単位以上/ 2 or more	
10	岩石学 I /Petrology I	選択/E	2	44	56	6単位以上/ 6 or more	
11	岩石学 II /Petrology II	選択/E	2	44	56		
12	電子線結晶学 /Electron crystallography	選択/E	2	44	56		
13	火山と島弧システム /Volcanone and the Arc Environment	選択/E	2	44	56		
14	ジオダイナミクス /Geodynamics	選択/E	2	44	56		
15	構造岩石学 /Structural Petrology	選択/E	2	44	56		
16	沈み込み帯のテクトニクス /Tectonics of subduction zones	選択/E	2	44	56		
17	マントル・地殻ダイナミクス /Dynamics of Mantle and Crust	選択/E	2	44	56		
18	古海洋学特論 /Paleoceanography	選択/E	2	44	56		
19	ダイナミック層序学 /Dynamic Stratigraphy	選択/E	2	44	56		
20	東アジアの地質 /Geology of East Asia	選択/E	2	44	56		
21	進化形態学 /Natural History	選択/E	2	44	56		
22	層序・堆積盆地解析基礎 /Basic Analysis of Stratigraphy and Basin Sedimentology	選択/E	2	44	56		
23	中間発表M /Presentation of Research Progress Report M	必修/R	1	77	57	25単位以上 論文作成 演習Mと 地球科学特定 研究Mb は選択必修/ 25 or more: Academic Writing Exercise M and Project Research in Earth Science Mb are required electives.	
24	学術発表演習M /Presentation Exercise M	選択/E	2	44	57		
25	論文作成演習M /Academic Writing Exercise M	選択必修/ ReqE	8	44	57		
26	地球科学特定研究Mb /Project Research in Earth Science Mb	選択必修/ ReqE	8	77	57		
27	地質エンジニアリング実習M /Geological Engineering Exercise M	選択/E	2	44	57		
28	サイエンスコミュニケーション実習M /Science Communication Exercise M	選択/E	2	44	57		
29	地球科学演習Ma /Seminar in Earth Science Ma	必修/R	4	44	57		
30	地球科学演習Mb /Seminar in Earth Science Mb	必修/R	4	44	57		
31	地球科学特定研究Ma /Project Research in Earth Science Ma	必修/R	8	77	57		
32	所属専攻科目 /Department course(s)	選択/E	-	-	-		
合計38単位以上 /Total: 38 credits or more							

- 【備考】 課程共通科目(a)は、所属専攻の科目として取り扱う。
(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)
- 【Notes】 M(a) indicates Master's common course(a). It is treated as a Department course.
(Other Master's common courses (except General Natural Sciences offered outside the Department) do not count toward the degree.)

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(A)	(B)	(C) (D) (E)
1期	自然科学総論	他専攻科目, 専門科目	地球科学特定研究Ma
2期			地球科学演習Ma
3期			地球科学特定研究Ma
4期			地球科学演習Ma
		専門科目	地球科学特定研究Mb
			地球科学演習Mb, 中間発表M
			地球科学特定研究Mb
			地球科学演習Mb

4. キャリアパス形成に関連した科目群 (紹介)
キャリアパス形成に関連し、下記の課程共通科目が開設されています。(修了要件対象外)
修士のためのキャリアマネジメントセミナー (2単位)

災害環境科学コース（M）／Natural Disaster and Environmental Science Course (M)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

(A) The ability to make comprehensive judgements regarding nature, society and humanity

(B) The ability to understand and apply fundamental theories and technologies

(B-1) A mastery of fundamental theories and technologies aimed at elucidating the mechanisms of occurrence as well as at taking preventative and mitigating measures regarding slush flow from heavy snowfalls, avalanches, and melting snow, disasters in snowy, icy regions such as urban snow damage, etc., complex disasters during snow seasons, and floods, tsunamis, and other water disasters

(B-2) A mastery of fundamental theories and technologies aimed at elucidating the mechanisms of occurrence as well as at taking preventative and mitigating measures regarding volcanic disasters as well as ground and sediment disasters such as earthquakes, ground subsidence, landslides, debris flows, etc.

(C) The ability to discover and solve problems

(D) The ability to communicate effectively, including academic conference presentations

(E) The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1	自然科学総論Ⅰ・Ⅱ・Ⅲ・Ⅳ(*いずれか1科目) ／General Natural Sciences I・II・III・IV(*Choose one)	必修／R	1	99	46	1単位／1	他専攻開設／in other Depts
2	自然災害環境論／Topics in natural hazard environments	必修／R	1	50,52,53	46	1単位／1	
3	突発災害特論／Advanced topics in catastrophic hazards	必修／R	1	44	46	1単位／1	
4	他専攻科目及び下記の課程共通科目 ／course(s) in other Depts & the following Master's common courses		-	-	-		
5	企業・研究機関の研修・見学 ／Tour/Visit to Businesses and Research Institutes		1	74	46		課程共通科目(b)／M(b)
6	プロジェクト研究特別概説 ／Introduction to University Research Projects	選択必修 ReqE	1	99	47	2単位 以上 2 or more	課程共通科目(b)／M(b)
7	先端科学技術総論 ／Special Topics in Advanced Science and Technology		1	99	46		課程共通科目(b)／M(b)
8	修士のためのインターンシップ／Internship for master's courses		1	74	47		課程共通科目(b)／M(b)
9	大型機器分析技術／Techniques in instrumental analysis		2	99	46		課程共通科目(b)／M(b)
10	教職実践学校インターンシップ／School Internship (Teaching Practice)	選択／E	4	-	-		
11	大気影響評価学特論／Advanced assessment of atmospheric impacts	選択／E	2	46	36		専攻共通科目 Dept common courses
12	大気環境科学特論／Advanced atmospheric environmental sciences	選択／E	2	46	36		
13	気象災害特論／Topics in Meteorological Disasters	選択必修／ReqE	2	44	56		
14	災害復興学特論／Empirical Study of Disaster Recovery	選択必修／ReqE	2	99	46		
15	水災害特論／Water Disaster Science	選択必修／ReqE	2	52	56		
16	第四紀・地盤災害特論／Geological Hazards	選択必修／ReqE	2	44	46		
17	環境保全学特論 ／Advanced Conservation Engineering of Natural Environment	選択必修／ReqE	2	44,52,62	56		
18	災害地球化学特論／Geochemistry of Natural Hazards	選択必修／ReqE	2	44,62	56		
19	火山災害特論／advanced topics in volcanic hazards	選択必修／ReqE	2	44	56		
20	環境科学特定研究Ⅰ ／Project Research in Environmental Science and Technology I	必修／R	7	77	57		
21	環境科学特定演習Ⅰ ／Specific Seminar in Environmental Science and Technology I	必修／R	4	77	57		
22	研究発表演習Ⅰ（中間発表）／Research Presentation I (Interm.)	必修／R	1	77	57		
23	研究発表演習Ⅰ（学外発表）／Research Presentation I (Congress)	選択／E	1	77	57		
24	環境科学セミナーⅠ ／Seminar in Environmental Science and Technology I	必修／R	2	77	57		
25	環境科学総合演習Ⅰ ／Synthetic Seminar in Environmental Science and Technology I	必修／R	2	77	57		
26	所属専攻科目／Department course(s)	選択／E	-	-	-		

修得単位：必修19単位、選択必修12単位以上修得のうえ、合計38単位以上修得のこと。
Credit Required: Total 38 credits or more including 19 credits in required courses and 12 credits or more in required elective courses

【備考】課程共通科目(b)は、他の専攻の科目として取り扱う。

(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)

【Notes】M(b) indicates Master's common courses(b). They are treated as courses in other Departments.

(Other Master's common courses (except General Natural Sciences in other Departments) do not count toward the degree.)

3. 必修授業科目履修の流れ（目安）

セメスター	(A)	(B)	(C) (D) (E)
1期	自然科学総論	共通科目(必修) 他専攻科目(1科目以上) 専門科目(2科目以上)	環境科学セミナーⅠ
2期		共通科目(必修) 専門科目(2科目以上)	研究発表演習Ⅰ (中間発表) 環境科学セミナーⅠ
3期		専門科目(1科目以上)	環境科学特定研究Ⅰ 環境科学特定演習Ⅰ
4期			環境科学総合演習Ⅰ

4. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

フィールド科学コース (M) / Field Research in the Environmental Sciences Course (M)

1. コース教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) The ability to make ethical judgements regarding nature, society, and humanity

(B) The ability to understand and apply fundamental theories and technologies

(B-1) The ability to understand biological ecology at a wide range of scale from population down to cell-level and apply the knowledge gained to wild animal and plant management

(B-2) The ability to understand the impacts of global environmental changes on materials and energy cycle in the areas of air, water, and land, as well as the resulting influences on ecosystem, and the ability to examine countermeasures

(B-3) The ability to understand the mechanism of snow and ice, water, ground and landslide, and volcanic disasters as well as any combination thereof and to apply one's understanding for the purpose of disaster prevention and mitigation technologies.

(C) The ability to discover and solve problems

(D) The ability to communicate effectively, including academic conference presentations

(E) The ability to report within a specified period of time

達成目標 Objectives	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(A) (B)	自然科学総論 I・II・III・IV(*いずれか1科目) /General Natural Sciences I・II・III・IV (*Choose one)	必修/R	1	99	46	5単位 以上/ 5 or more	他専攻開設 / in other Depts
	環境ガバナンス概論 / Introduction to Environmental Governance	必修/R	2	99	46		
	他専攻科目 / course(s) in other Depts	必修/R	2	-	-		
	企業における生産・開発 I /Lecture on Manufacturing and Development Research I	選択/E	1	74	47		課程共通科目(a) / M(a)
	プロジェクト研究特別概説 / Introduction to University Research Projects	選択/E	1	99	47		課程共通科目(a) / M(a)
	先端科学技術総論 / Special Topics in Advanced Science and Technology	選択/E	1	99	46		課程共通科目(a) / M(a)
	修士のためのインターンシップ / Internship for master's courses	選択/E	1	74	47		課程共通科目(a) / M(a)
	修士のためのキャリアマネジメントセミナー /Career Management Seminar for Postgraduate students	選択/E	2	99	48		課程共通科目(a) / M(a)
	突発災害特論 / Advanced topics in catastrophic hazards	選択/E	1	44	46		
(B-1)	森林保全学特論 / Advanced Forest Conservation	選択/E	2	62	46	10単位 以上/ 10 or more	ただし、研究指導委員会が認めた他コースまたは他専攻の科目を、当該分野の専門科目として認定可とする。 / Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B-1) through (B-3).
	野生植物生態学特論 / Topics on plant community dynamics	選択/E	2	57	56		
	自然再生学特論 / Restoration Ecology	選択/E	2	57	56		
	森林遺伝育種学特論 / Advanced Forest Genetics and Tree Breeding	選択/E	2	62	56		
	島嶼生態学特論 / Island Ecology	選択/E	2	57	56		
	神経内分泌学 / Neuroendocrinology	選択/E	2	57	47		
	水圏生物学 / Aquatic Biology	選択/E	2	57	58		
	進化生物学特論 IV / Evolutionary Biology IV	選択/E	2	57	46		
	動物生態学特論 / Advanced Animal Ecology	選択/E	2	57	56		
	希少生物学特論 / Biology of Rarity	選択/E	2	57	46		
流域環境思想論 / Environmental Philosophy on Watershed	選択/E	2	99	37			
(B-2)	森林空間計測学特論 / Advanced Forest Spatial Information	選択/E	2	62	56		
	生態系環境学特論 / Advanced Ecosystem Environment	選択/E	2	62	56		
	大気物理学特論 I / Atmospheric Physics I	選択/E	2	43	46		
	大気影響評価学特論 / Advanced assessment of atmospheric impacts	選択/E	2	46	36		
	大気環境科学特論 / Advanced atmospheric environment sciences	選択/E	2	46	36		
	環境化学要論 I / Chemistry of the Environment I	選択/E	2	46	46		
	環境化学要論 II / Chemistry of the Environment II	選択/E	2	46	46		
	水文学特論 / Advanced Hydrology	選択/E	2	62	56		
(B-3)	農業水利調整論 / Advanced Agricultural Water Management	選択/E	2	65	56		
	地圏環境論 I / Environmental Science of Earth Surface I	選択/E	2	44	46		
	森林保全工学特論 / Advanced Erosion Control Engineering	選択/E	2	62	56		
	気象災害特論 / Topics in Meteorological Disasters	選択/E	2	44	56		
	災害地球化学特論 / Geochemistry of Natural Hazards	選択/E	2	44,62	56		
	水災害特論 / Water Disaster Science	選択/E	2	52	56		
	第四紀・地盤災害特論 / Geological Hazards	選択/E	2	44	56		
	火山災害特論 / advanced topics in volcanic hazards	選択/E	2	44	56		
環境保全学特論 /Advanced Conservation Engineering of Natural Environment	選択/E	2	44,52,62	56			
(C) (D) (E)	環境科学特定研究 IV /Project Research in Environmental Science and Technology IV	必修/R	7	77	57	16単位 以上/ 16 or more	
	環境科学特定演習 IV /Specific Seminar in Environmental Science and Technology IV	必修/R	4	77	57		
	研究発表演習 IV (中間発表) / Research Presentation IV (Intern.)	必修/R	1	77	57		
	研究発表演習 IV (学外発表) / Research Presentation IV (Congress)	選択/E	1	77	57		
	環境科学セミナー IV /Seminar in Environmental Science and Technology IV	必修/R	2	77	57		
	環境科学総合演習 IV /Synthetic Seminar in Environmental Science and Technology IV	必修/R	2	77	57		
所属専攻科目 / Department course(s)	選択/E	-	-	-			

修得単位：必修21単位修得のうえ、合計38単位以上修得のこと。

Total: 38 credits or more including 21 credits in required courses and 10 credits or more in required elective courses

【備考】課程共通科目(a)は、所属専攻の科目として取り扱う。

(その他の課程共通科目(他専攻で開設する自然科学総論を除く)は修了要件対象外とする。)

【Notes】M(a) indicates Master's common courses(a). They are treated as Department courses.

(Other Master's common courses (except General Natural Sciences offered in other Departments) do not count toward the degree.)

3. 必修授業科目履修の流れ (目安)

セメスター	(A)	(B)	(C) (D) (E)
1期	自然科学総論, 環境ガバナンス概論 他コース専門科目 (1科目以上)	共通科目(必修) 専門科目 (2科目以上)	環境科学セミナーIV
2期		専門科目 (2科目以上)	環境科学総合演習IV
3期		専門科目 (1科目以上)	環境科学特定研究IV
4期			環境科学特定演習IV

(3) Important study-related notes

(1) Standard term of study and completion requirements

The standard term of study for Master's Programs at the Graduate School is two years. Completion requires students to be enrolled for at least two years, earn either at least 38 or 42 credits depending on the course standards stipulated in Appended Table 4 of the Niigata University Graduate School of Science and Technology Regulations and the educational program in the course concerned. In addition, it requires them to submit a dissertation or specific research work as an application for degree conferral after receiving the necessary research supervision, and finally pass dissertation review and final examination.

It is not possible for a student to remain enrolled for longer than four years.

Graduate School of Science and Technology Master's Program registration requirements

Subject registration	Class subjects and numbers of credits by major
Completion requirements	Students are required to be enrolled for a minimum of two years, earn either at least 38 or 42 credits in class subjects stipulated by the course concerned, and pass master's dissertation or specific research review and final examination after receiving the necessary research supervision.
Short-term completion requirements	A period of enrollment of at least one year shall be deemed sufficient for students who have achieved excellent academic performance and have been approved by the faculty council.
Credit standards	Lectures: One credit / 15 hours Seminars: One credit / 15 hours Laboratory work and workshops: One credit / 30 hours
Study requirements	Class subjects in department: The number of credits stipulated by the department concerned General Natural Sciences: One credit (Compulsory elective; Subject offered by other department) Class subjects in other departments: Two or more credits
Taking class subjects at other graduate schools	When deemed educationally beneficial, students may take class subjects at other graduate schools at Niigata University. Up to eight of such credits will be treated as having been earned at the Graduate School.
Taking class subjects at graduate schools of other universities	When deemed educationally beneficial, students may take class subjects at graduate schools at other universities with which the Graduate School has discussed the matter. Up to fifteen of such credits will be treated as having been earned at this Graduate School.

Subject registration	Class subjects and numbers of credits by major
Research supervision at graduate schools of other universities	When deemed educationally beneficial, students may receive research supervision at research institutes and graduate schools of other universities with which the Graduate School has discussed the matter. However, research supervision may not be received at graduate schools of other universities for longer than one year.

(2) Research supervision

In regard to research supervision at graduate schools, Article 12 of the Standards for Establishment of Graduate Schools stipulates that “Graduate school education shall be provided via classes on course subjects and research supervision.”

Research-related supervision is not to be based on a credit system, and is required to be provided in a variety of formats. As it has a significant impact on graduate school education, research supervision has also become a course completion requirement at the Graduate School.

Research supervision provided at the Graduate School is provided broadly and effectively by a main supervisor and two sub-supervisors (collectively referred to as “supervisors”) assigned to each enrolled student.

As a general rule, students must decide on a research topic within one month of enrollment after consulting with their supervisors.

(3) Class subjects

a. Class subjects

Class subjects at the Graduate School are stipulated in the Niigata University Graduate School of Science and Technology Regulations and are classified as follows.

Lectures are class subjects taught by full-time faculty members, faculty members holding more than one post, and part-time lecturers.

Seminars and specified research are class subjects established under common themes within the course as well as specified topics for each student. Contents and formats are stipulated within each department or course.

Each subject offered at the graduate school is represented by a two-digit code combination. It consists of 3, 4, or 5 as the tens digit, and 6, 7, 8, or 9 as the unit digit.

- 3 Subjects open to all graduate school students
- 4 Subjects only open to students in the Graduate School of Science and Technology
- 5 Subjects only open to students who belong to a specific department
- 6 Master’s Program basic level
- 7 Master’s Program core level
- 8 Doctoral Program basic level
- 9 Doctoral Program core level

b. Study requirements

Students must select class subjects in the course concerned as well as class subjects in other courses or departments after first consulting with the aforementioned supervising committee (main supervisor and two sub-supervisors), and must earn at least either 38 or 42 credits as stipulated in Appended Table 4 of the Niigata University Graduate School of Science and

Technology Regulations.

c. Registration procedures

As a general rule, students must decide on class subjects and prepare a study plan within one month of enrollment after first consulting with their supervising committee.

In addition, at the beginning of each program year, students must determine which class subjects to take that year and submit a registration notification using the designated format.

d. Recognition of credits

Recognition of credits for students deemed to have a sufficient number of hours of attendance in lectures and other activities shall be conducted via written or oral examinations and research reports.

e. Make-up examinations

Make-up examinations may be held for students unable to take regularly-scheduled tests due to illness or other unavoidable circumstances. The faculty member in charge of the class concerned will indicate date, time, location, etc. for make-up examinations.

f. Grade assessments and standards

Class subjects are assessed on a 100-point scale with 60 points or higher passing and 59 points or lower failing. Passing students are awarded the designated credits.

Letter grades are assigned as follows: 80 points or higher = A; 70 to 79 points = B; 60 to 69 points = C; and 59 points or lower = D.

Grade assessment standards are as follows.

Points	Letter grade	Standard
80 to 100 points	A	The student has fully achieved the learning objectives of the class subject.
70 to 79 points	B	The student has achieved the learning objectives of the class subject to a certain degree.
60 to 69 points	C	The student has achieved the minimum learning objectives of the class subject.
0 to 59 points	D	The student has failed to achieve the minimum learning objectives of the class subject.

(4) Curricula

While curricula naturally aim to provide highly specialized education by further advancing students' undergraduate educations, the curricula also aim to instill interest in a broad range of other fields beyond personal specialties by having students acquire more extensive knowledge of the fundamentals of the natural sciences as well as basic applied technologies.

Specifically,

- a. Curricula are organized to enable students to acquire fundamental knowledge of the specialized fields within each department.

- b. Class subjects open to all students in similar education and research fields are established.
- c. The following compulsory elective subjects are established in order to develop broad, comprehensive, integrated, fundamental knowledge.

General Natural Sciences (Compulsory elective subject)	These are general subjects held for students in other majors to introduce them to topics in specialized fields and discuss social issues relating to science and technology. Students are required to earn one credit.
Class subjects in other majors (Compulsory elective subject)	Students are required to take a certain number of credits from class subjects in other departments in order to acquire broad, integrated knowledge.

(5) Taking class subjects at other graduate schools

Students may take class subjects at other graduate schools if deemed educationally beneficial by their supervising committee.

Taking class subjects at another graduate school requires approval from the faculty council as well as discussion between this university and the graduate school concerned. Obtaining approval from other graduate schools requires a considerable period of time, so interested students must inform their main supervisor as early as possible.

Up to fifteen credits earned via class subjects taken at the other graduate school will be treated as having been earned at this Graduate School, and these may be certified as a portion of the credits required for course completion.

(6) When receiving research supervision at other graduate schools

Students may become a special visiting research student receiving research supervision at other graduate schools or research institutes if deemed educationally beneficial by their supervising committee.

Becoming a special visiting research student requires approval from the faculty council as well as discussion between Niigata University and the graduate school concerned. Obtaining approval from other graduate schools requires a considerable period of time, so interested students must inform their main supervisor as early as possible.

(4) Degrees

(1) Degree conferral

Students completing a Master's Program at the Graduate School shall be awarded a master's degree.

(2) Handling of dissertations

For information beyond the stipulations of the Niigata University Degree Regulations on how the Graduate School of Science and Technology handles dissertation submission qualifications, application procedures, dissertation review, etc., please carefully read the following "Procedures, etc. relating to degree conferral" and "Guidelines on writing dissertations, etc. as applications for degree conferral."

○ Degree Conferral Procedures

Please note the following matters regarding procedures, etc. relating to degree conferral in Master's Programs.

1 Dissertation submission eligibility

Students deemed capable of meeting the Master's Program completion requirements shown in Items (1) or (2) below shall be considered eligible.

- (1) Students who have earned the credits stipulated in Article 9-2 of the Graduate School of Science and Technology Regulations by the end of the second program year of enrollment in the Graduate School and received the necessary research supervision
- (2) Students deemed to have outstanding research performance by the faculty council pursuant to the proviso in Article 32-1 of the Niigata University Graduate School Regulations, and have earned the credits stipulated in Article 9— 2 of the Graduate School of Science and Technology Regulations and received the necessary research supervision.

(For reference)

- Article 9-2 of the Graduate School of Science and Technology Regulations: "Regarding the class subjects stipulated in the preceding paragraph, students in Master's Programs must earn either at least 38 or 42 credits depending on the standard credit requirements for the department concerned, as shown in Appended Table 4."
- Article 32-1 of the Niigata University Graduate School Regulations: "In order to complete an initial two-year doctoral (*hakase zenki*) program or a master's program, students are required to be enrolled in the graduate school concerned for a minimum of two years, earn at least 30 credits in class subjects stipulated by the graduate school concerned, and pass master's dissertation or research review and the final examination after receiving the necessary research supervision. However, a period of enrollment of at least one year shall be deemed sufficient for students deemed to have achieved excellent academic performance by the faculty council."

2 Dissertation submission

Students applying for master's dissertation review after being deemed eligible for dissertation submission by their main supervisor must submit the following designated documents to their main supervisor.

(1) Documents to submit

- | | |
|---|--------|
| 1) Dissertation Review Application (Form 1) | 1 copy |
| 2) Dissertation (on A4-size paper, in either Japanese or English) | 1 copy |
| 3) Dissertation Register (Form 2) | 1 copy |
| 4) Dissertation Abstract (approx. 2,000 Japanese characters in length) (Form 3) | 1 copy |
| 5) Curriculum Vitae (Form 4) | 1 copy |

(2) Dissertation submission periods are as follows.

- 1) For conferral in March: From January 19 to January 25
- 2) For conferral in September: From July 15 to July 21

3 Final examination

Final examinations are held orally during dissertation presentations with a focus on the contents of the dissertation under review.

4 Dissertation review

Dissertations are reviewed to determine worthiness as a master's dissertation, and approval of the field in which the degree is to be granted is also provided during the review process.

Dissertation review standards at the Graduate School of Science and Technology of Niigata University

Master's Programs

1. Research contents: Whether or not the research contents are either novel, original, or useful
2. Understanding of research trends: Whether or not the student has surveyed the prior research through searching the literature, participating in academic conferences, etc. and understands the background, significance, and importance of one's own research
3. Research plan and method: Whether or not the research plan and method are appropriate
4. Analysis of research findings: Whether or not the analysis of research findings is appropriate, and whether or not the student was able to obtain novel findings
5. Dissertation writing ability: Whether or not the format and contents of the paper are at the level of a master's dissertation
6. Dissertation presentation ability: Whether or not the student is able to present the research contents in an easy-to-understand manner at graduate school presentations, academic conferences, etc. and able to appropriately answer questions

5 Open dissertation presentation

As dissertation presentations are organized by department, the students concerned must comply with the instructions of the department concerned.

6 Degree conferral

Students who pass dissertation review and the final examination will receive a master's degree.

○ Guidelines on writing dissertations as applications for degree conferral

Students applying for master's dissertation review at the Graduate School must create documents in accordance with these guidelines.

Documents will not be accepted until they are in order, so students must have them inspected by their main supervisor.

1 Creating dissertation documents

(1) Dissertation Review Application [Form 1]

(2) Dissertation (on A4-size paper; in either Japanese or English)

Dissertations must be organized as follows.

- 1) Dissertations must display a title, the name of the department, and the name of the student.
- 2) As a general rule, dissertations must be submitted on white, high-quality paper.
- 3) The paper must be portrait-oriented, and text must be horizontal.
- 4) While it is preferable for dissertations to be printed in a long-lasting format, they may also be written on word processors or by hand, or copied.
When writing by hand, it is necessary to use black ink or a black ballpoint pen and write horizontally and carefully. When writing in English, it is necessary to use a word processor.
- 5) All dissertations in English must be created using a word processor.
- 6) It is not possible to correct or replace dissertations once submitted, so students must ensure that there are no typographical errors, omissions, etc.
- 7) Dissertation covers must be created using the designated format.

(3) Dissertation Register [Form 2]

- 1) Dissertation registers must be created as shown in the example provided.
- 2) A title (including subtitle) must be displayed in the same manner as for dissertation submission.

Students must confer well with their main supervisor to ensure that the title will require no later revisions.

- 3) Dissertations titled in English must display the Japanese translation in parentheses under the title.
- 4) The list of reference papers must include papers previously presented by the degree-seeker that are related to the dissertation concerned. (Papers not relevant to the dissertation concerned must not be listed.)

(4) Dissertation Abstract [Form 3]

- 1) Abstracts must use Form 3 as the cover page.
- 2) The text must be approx. 2,000 Japanese characters in length and in accordance with the designated format.
- 3) When writing by hand, it is necessary to use black ink or a black ballpoint pen and write horizontally and carefully. When writing in English, it is necessary to use a typewriter or word processor.
- 4) All abstracts in English must be created using a typewriter or word processor.

(5) Curriculum Vitae [Form 4]

- 1) Curriculum Vitae must be created as shown in the example provided.
- 2) The name of the student must be displayed exactly as it appears on his/her family register, and no nicknames, alias, pseudonyms, etc. may be used whatsoever. Names must also feature *furigana*.
- 3) The student's legal domicile must display the name of the prefecture only. Foreign nationals must display the name of the country.
- 4) The current address must display the address where the student is currently residing, including "in care of xxx" if applicable.
- 5) Academic history must list university graduation, scheduled completion of graduate

school, and other matters relating to educational background in chronological order. Students must also list all changes in status, including admission, leave of absence, re-admission, etc. Changes to school names during the period of enrollment and other such changes must also be listed.

- 6) If the student was enrolled as a research student prior to enrolling at the Graduate School, then research history must list its details in chronological order. Students with no research history must write "None."
- 7) Employment history must list the place of employment, occupational title, etc. for each full-time position held in chronological order. It is also preferable to list any part-time positions particularly related to education or research. Students with no employment history must write "None."

2 Other

- (1) Documents must be filled out and created carefully and accurately.
- (2) If you have any questions about these creation guidelines, please contact the Graduate School of Science and Technology Academic Affairs Division.

論 文 目 録

/ 頁

報告番号	第 号	在籍番号	
専攻		コ ー ス	氏 名
学位申請論文			
題名 の研究 又は Research of (..... の研究) ※和訳を付すこと			
参考論文は以下のとおり 編である。			
著者名および題名			
1. ○○○○他○名： の研究 令和 年 月発行 ○○○雑誌 第○巻第○号 ○○～○○頁に発表 (又は掲載決定)			
2. ○○○○他○名 : Research of (..... の研究) ※和訳を付すこと 令和 年 月発行 Journal of ○○○ Vol.○○,no.○○,pp○○～○○ に発表 (又は掲載決定)			
3. (以下上記と同じように記載する。)			
(注) 1. 参考論文の雑誌掲載の場合は、上記記載例のように記入する。 2. 論文題名が外国語の場合は、題目の下に日本語の訳文をカッコ書きで記入すること。 3. 参考論文は、著者名、論文名、雑誌等の発行年月日、雑誌名、巻、号、掲載頁の順に記入すること (上記例を参照のこと)。 著者が複数の場合は、当該雑誌等に記載された著者名の順に全員記入すること。 ただし、多数の場合には、主な共著者5名程度を記入し、その後に「他○名」と表示すること。 掲載頁は、初めと終わりの頁を記入すること。 なお、論文が未発表で掲載決定の場合は、頁を記入する必要はないが、学会等からの「掲載決定証明書の写し」を添付すること。			

履 歴 書

/ 頁

報告番号	第 号		
ふりがな	にいがた たろう		性別
氏名	新潟 太郎		
生年月日	昭和・平成 西暦(留学生) ○○年 ○○月 ○○日 生		
本籍 ※戸籍の所在地	○○ 都道府県 (留学生は国籍)	在籍番号	F○○A○○○A
現住所 電話番号	新潟県新潟市西区五十嵐二の町8050番地(下宿等は～方まで) () -		
最終学歴			
令和○年○月○日	○○大学○○学部○○学科卒業		
令和○年○月○日	○○大学大学院○○研究科		
	○○○○専攻修士課程(又は博士前期課程等)入学		
令和○年○月○日	○○大学大学院○○研究科		
	○○○○専攻修士課程(又は博士前期課程等)修了予定		
研究歴			
令和○年○月○日 ～令和○年○月○日	○○大学○○学部○○学科○○教授の下で、研究生として ○○○○○についての研究に従事		
令和○年○月○日 ～令和○年○月○日	○○○株式会社○○研究所において、○○○○○に関する 研究に従事		
※研究歴がない場合は「なし」と記入願います。			
職歴			
令和○年○月○日	○○株式会社○○研究所研究員		
令和○年○月○日	同上退職		
※職歴がない場合は「なし」と記入願います。			

学位申請論文の表紙〔作成例〕

●日本語の場合

○ ○ ○ の 研 究 副 題 氏 名	○ ○ ○ ○ ○ の研究 — 副 題 — 氏 名 ○ ○ ○ ○ 新潟大学大学院自然科学研究科博士前期課程 ○ ○ ○ ○ 専攻
--	---

●英語の場合

○ ○ ○ ○	S t u d y o n ○ ○ ○ ○ ○ — S u b t i t l e — N a m e ○ ○ ○ ○ M a s t e r ' s P r o g r a m i n ○ ○ ○ ○ G r a d u a t e S c h o o l o f S c i e n c e a n d T e c h n o l o g y N i i g a t a U n i v e r s i t y
------------------	--

(博士前期課程専攻名)

数理物質科学専攻

材料生産システム専攻

電気情報工学専攻

生命・食料科学専攻

環境科学専攻

Master's Program in Fundamental Sciences

Master's Program in Advanced Materials Science and Technology

Master's Program in Electrical and Information Engineering

Master's Program in Life and Food Sciences

Master's Program in Environmental Science and Technology

Degree Conferral Guidelines via Completion of Master's Program
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Purpose)

1. These guidelines stipulate necessary matters concerning conferral of master's degrees via completion of a Master's Program at the Graduate School of Science and Technology of Niigata University (hereinafter the "Graduate School").

(Eligibility, etc. for dissertation submission)

2. Only students who have received the necessary research supervision and fall into either of the following categories as of the end of the semester in which the student concerned wishes to receive a degree are eligible to apply for dissertation review.

(1) Students who have been enrolled for the designated term of study and have earned the designated number of credits

(2) Students deemed by the faculty council to have outstanding achievements, who have been enrolled for at least one academic year, and have earned the designated number of credits (excluding students registered pursuant to Article 8 of the Niigata University Graduate School of Science and Technology Regulations (2004 GSSTR Ver. 1))

(Main supervisor approval)

3. Students wishing to apply for dissertation review must perform the procedures stipulated in No.4 after obtaining approval from their main supervisor.

(Procedures, etc. for dissertation submission)

4. Students who have obtained the approval stipulated in No. 3 must submit the following documents to the dean via their main supervisor. In addition, students may be asked to provide additional documents when necessary for review purposes.

- | | |
|---|--------|
| (1) Dissertation Review Application (Form 1 specified elsewhere) | 1 copy |
| (2) Dissertation (on A4-size paper; in either Japanese or English) | 1 copy |
| (3) Dissertation Register (Form 2 specified elsewhere) | 1 copy |
| (4) Dissertation Abstract (approx. 2,000 Japanese characters in length) | 1 copy |
| (5) Curriculum Vitae (Form 4 specified elsewhere) | 1 copy |

4-2. Dissertation submission periods are as follows.

(1) Students wishing degree conferral in March
From January 19 to January 25

(2) Students wishing degree conferral in September
From July 15 to July 21

(Acceptance of dissertations)

5. Once a dissertation has been accepted, the dean must entrust its review to the faculty council.

(Recommendations, etc. for review committee candidates)

6. The dean shall entrust main supervisors with the following matters.

(1) Recommendations for review committee candidates

(2) Selection of name of field to be added to the master's degree

6-2. Upon being entrusted with review as stipulated in the preceding item, the main supervisor shall recommend three professors in charge of the Graduate School as review committee candidates (one main reviewer and two sub-reviewers; associate professors may be appointed if necessary) for each dissertation, and the main supervisor shall select the name of the field to be added to the master's degree.

6-3. When necessary for review purposes, it shall be possible to include among the review committee candidates mentioned in the preceding section other faculty members from the Graduate School, faculty members from other graduate schools or research institutions at Niigata University, or faculty members from graduate schools or research institutions at other universities.

6-4. The main supervisor must promptly report the results of No. 6-1 to the dean using the form prescribed separately (Form 5).

(Establishment of a review committee)

7. The faculty council shall establish a review committee for each dissertation, and shall discuss and select review committee members (one main reviewer and two or more sub-reviewers) based on the review committee candidates recommended by the main supervisor pursuant to No. 6-4.

(Dissertation review and final examination)

8. The review committee shall review the contents of the dissertation, discuss the name of the field to be added to the degree, and hold the final examination, and must complete these by a date to be stipulated separately.

8-2. The main reviewer shall have the student present the contents of the dissertation at a dissertation presentation.

8-3. Once finished with the review, the review committee shall issue a report to the faculty council together with the Dissertation Abstract, Summary of Review Results (Form 6 specified elsewhere), and Summary of Final Examination Results (Form 7 specified elsewhere).

(Deliberation on course completion)

9. The faculty council shall deliberate on whether or not the student has satisfactorily completed the program based on the review committee's report.

Supplementary Provision

These guidelines are effective as of April 1, 2004.

Supplementary Provision

These guidelines are effective as of April 1, 2007.

Supplementary Provisions

1. These guidelines are effective as of April 1, 2010.

2. Degree conferral for students who enrolled during or prior to AY2010 shall be governed in accordance with provisions then in effect.

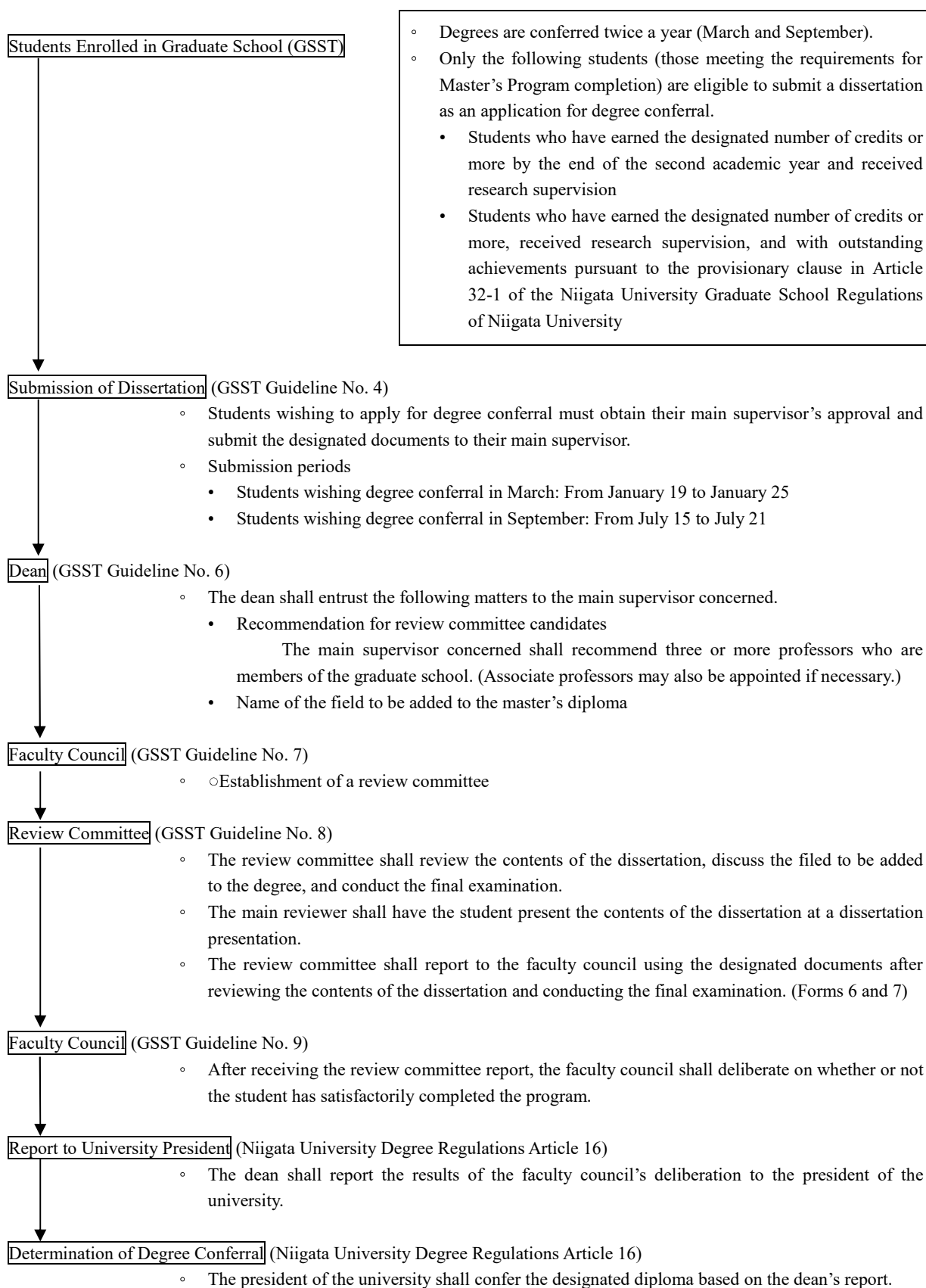
Supplementary Provision

These guidelines are effective as of April 1, 2015.

Supplementary Provision

These guidelines are effective as of April 1, 2018.

Degree Conferral Flowchart via Completion of Master's Program



Note: Detailed schedule shall be determined by the faculty council.

Terms of Agreement on Degree Conferral Guidelines via Completion of Master's Program
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Partially revised on March 25, 2015)

Article 1. Research supervisory approval for students wishing to undergo dissertation review pursuant to Article 3 of the Degree Conferral Guidelines via Completion of Master's Program at the Graduate School of Science and Technology of Niigata University (hereinafter the "Guidelines") shall in principle be handled as follows.

- (1) The supervising committee shall determine whether or not the student concerned possesses the academic and research capabilities to write a dissertation as an application for degree conferral via a presentation of research findings (hereinafter "interim research presentation"), and shall determine whether or not to approve submission of application based on the results.
- (2) The method by which the interim research presentation is held shall be determined by the department of the student concerned.

Article 2. Pursuant to Guideline No. 9 and Article 16 of the Niigata University Degree Regulations, in the event that the applicant is not deemed worthy of master's degree conferral, the applicant may request the university president to explain the reason.

2. In the event that the applicant is not deemed worthy of master's degree conferral, this shall not prevent the applicant from re-applying using a dissertation on the same research topic.

Guidelines on Special Provisions for Terms of Study in Master's Programs
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Partially revised on June 14, 2006)

Regarding special provisions for terms of study, as they pertain to completion requirements for Master's Programs at the Graduate School pursuant to Article 32-1 of the Niigata University Graduate School Regulations, the following guidelines shall be used when applying the designation of "students of outstanding achievements."

1. Application requirements (Students must meet all the conditions provided for in the following items (1) to (4). However, this shall not apply to students registered in accordance with Article 8 of the Niigata University Graduate School of Science and Technology Regulations.)

- (1) Must have at least one paper of high academic value published in an academic journal with a peer review system deemed acceptable by the department concerned (including papers accepted for publication)
- (2) Must be expected to be enrolled in the Master's Program at the Graduate School for at least one year and have earned (or be expected to earn) the designated credits
- (3) Must be capable of submitting a dissertation by the designated deadline
- (4) Must meet all conditions separately stipulated by the department concerned

2. Documents to submit

Students wishing to apply for these special provisions must submit the following documents to the dean via the chairperson of the research supervising committee.

- (1) Letter of Recommendation (Form specified elsewhere)
- (2) Dissertation Draft Abstract
- (3) Reference Papers (Either published or scheduled for publication)
- (4) Dissertation Register
- (5) Curriculum Vitae
- (6) Proof of Acceptance for Publication (for papers scheduled for publication)

3. Method of determining application of special provisions

If the student's research supervising committee chairperson deems the student to be "outstanding" and recommends application of the special provisions for term of study, the decision on whether to apply the special provisions shall be made in consultation with the faculty council prior to applying for dissertation review.

In addition, when making said decision, a subcommittee on special provisions for terms of study (the details of which are to be stipulated separately in advance) shall review whether the research achievements, etc. of the student concerned meet the application requirements provided for in Section 1.

4. Review within the course concerned

If the student's research supervising committee chairperson deems the student to be "outstanding" based on the research presentation, and wishes to recommend to the dean that the special provisions for term of study be applied, a review shall be conducted in advance within the course concerned to determine whether the student concerned meets the application requirements provided for in Section 1.

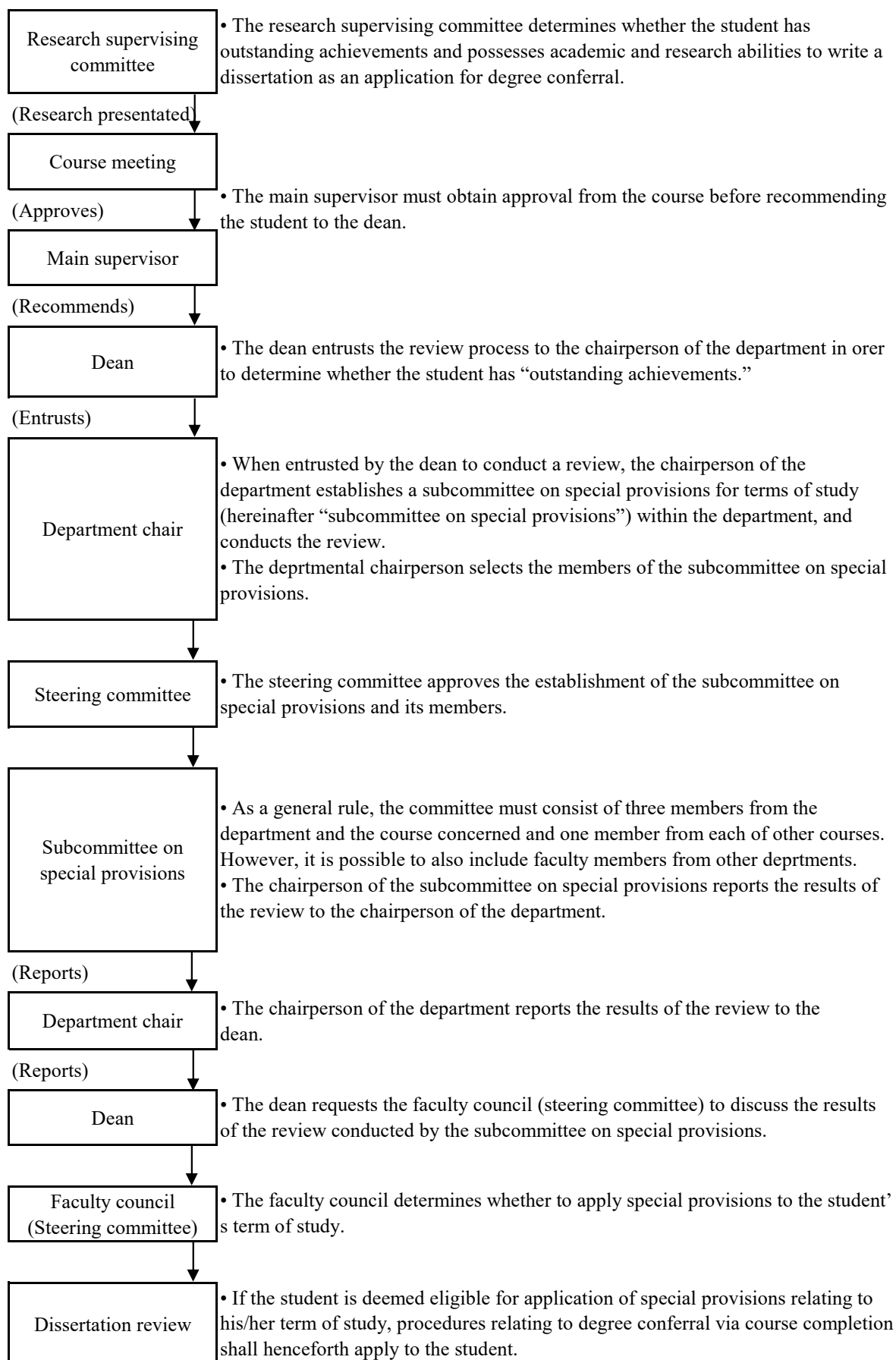
5. Subcommittee on special provisions for terms of study

- (1) Regarding completion requirements for Master's Programs at the Graduate School, subcommittees on special provisions for terms of study (hereinafter "subcommittees on special provisions") shall be established under the jurisdiction of the faculty council in order to review whether to apply the special provisions for terms of study to students deemed to be "outstanding."
- (2) Subcommittees on special provisions shall be composed of faculty council members belonging to the same department as the student applying for the special provisions.
However, it shall be possible to include one faculty council member from each of the other departments.
- (3) Establishment of subcommittees on special provisions and selection of committee members shall be entrusted to the steering committee by the faculty council.
- (4) Matters relating to the organization and administration of subcommittees on special provisions shall be stipulated separately.

Supplementary notes

1. Conditions separately stipulated by departments, as provided for in Section 1-(4), shall be established by each department.
2. Although the Graduate School intends to implement the special provisions for terms of study in accordance with these guidelines for the time being, the contents are subject to revision at any time in order to better reflect actual conditions.

Review Procedures Relating to Eligible Applicants of Special Provisions
 For Terms of Study in Master's Programs
 (“Outstanding students” pursuant to the proviso in Article 32-1
 of the Graduate School Regulations of Niigata University)



III Doctoral Programs

博士後期課程

(2) Educational Programs / 教育プログラム

○数理物質科学専攻(博士後期課程) / Department of Fundamental Sciences (Doctoral Programs)

物理学コース(D) / Physics Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, ethics and humanity
 (B) The ability to understand and apply advanced theories and technologies
 (B-1) A deeper understanding of the standard model of elementary particle physics as well as physical sciences that transcend this from experimental and theoretical perspectives
 (B-2) A deeper understanding of the structures and reactions of subatomic quantum systems from quarks and hadrons to atomic nuclei
 (B-3) A deeper understanding of the fundamental laws and basic physical processes behind the origin, structure and evolution of the universe and celestial bodies (general relativistic celestial objects, the early universe, the Milky Way, stars, etc.)
 (B-4) A deeper understanding of issues relating to early processes in the formation of the elements that make up the universe as well as the structures of unstable far removed from existing stable
 (B-5) A more advanced mastery of experiments and computer simulations relating to the complex physical properties of solid electrolytes, irregular semiconductors, nano-structured materials, etc.
 (B-6) The ability to elucidate the structures and phase transitions of substances on the mesoscale, and more advanced mastery regarding the development of data analysis methods and numeric
 (C) The ability to discover problems and the ability to solve problems
 (D) The ability to effectively communicate
 (E) The ability to give presentations at international conferences, etc.
 (F) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論 II・III・IV・V (*いずれか1科目) / General Natural Sciences II・III・IV・V (*Choose one)	選択/E	1	99	56	(注) 参照 (* footnote)	他専攻開設/ in other Depts
2	(他コース科目 / course(s) in other Courses)	必修/R	2	-	-		
3	高エネルギー物理学 I / High Energy Physics I	選択/E	2	43	59		
4	高エネルギー物理学 II / Advanced High Energy Physics II	選択/E	2	43	59		
5	ゲージ場理論特論 I / Gauge Field Theory I	選択/E	2	43	59		
6	ゲージ場理論特論 II / Gauge Field Theory II	選択/E	2	43	59		
7	ゲージ場理論特論 III / Gauge Field Theory III	選択/E	2	43	59		
8	非摂動的場の理論 I / Non-perturbative Field Theory I	選択/E	2	43	59		
9	非摂動的場の理論 II / Non-perturbative Field Theory II	選択/E	2	43	59		
10	量子色力学特論 I / Topics in Quantum Chromodynamics I	選択/E	2	43	59		
11	サブアトム物理学 I / Subatomic Physics I	選択/E	2	43	59		
12	原子核構造特論 I / Topics in Nuclear Structure I	選択/E	2	43	59		
13	原子核構造特論 II / Topics in Nuclear Structure II	選択/E	2	43	59		
14	宇宙物理学講義 I / Studies in Astrophysics I	選択/E	2	43	59		
15	宇宙物理学講義 II / Studies in Astrophysics II	選択/E	2	43	59		
16	ミュオン物質物理学特論 / Introduction to Muon Science	選択/E	2	43	59		
17	原子核量子多体論特論 / Nuclear Quantum Many-Body Theory: Advanced	選択/E	2	43	59		
18	不安定核物理学特論 / Topics in the physics of unstable nuclei	選択/E	2	43	59		
19	超伝導物理学 I / The physics of Superconductivity I	選択/E	2	43	59		
20	超伝導物理学 II / The physics of Superconductivity II	選択/E	2	43	59		
21	強相関物理学 I / Physics of Strongly Correlated Systems I	選択/E	2	43	59		
22	強相関物理学 II / Physics of Strongly Correlated Systems II	選択/E	2	43	59		
23	不規則系物理学 I / Physics of Disordered Systems I	選択/E	2	43	59		
24	不規則系物理学 II / Physics of Disordered Systems II	選択/E	2	43	59		
25	凝縮系物理学 I / Condensed matter physics I	選択/E	2	43	59		
26	計算物性学 / Computational Material Science	選択/E	2	43	59		
27	コラボレーション演習 / Collaboration Exercise	選択/E	1	43	59		
28	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択/E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
29	博士のキャリア開発の実践 / Practical career development for doctoral students	選択/E	1	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
30	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
31	数理物質科学特定研究 I (物理学) / Projective Research in Physics I	必修/R	4	43,77	59		
32	数理物質科学特定研究 II (物理学) / Projective Research in Physics II	必修/R	4	43,77	59		
33	数理物質科学特定研究 III (物理学) / Projective Research in Physics III	選択/E	4	43,77	59		
34	数理物質科学演習 I (物理学) / Seminar in Physics I	必修/R	2	43	59		
35	数理物質科学演習 II (物理学) / Seminar in Physics II	必修/R	2	43	59		
36	数理物質科学演習 III (物理学) / Seminar in Physics III	選択/E	2	43	59		
37	研究発表演習・発表 I / Presentation Exercise I	選択/E	1	43	59		
38	研究発表演習・発表 II / Presentation Exercise II	選択/E	1	43	59		
39	研究発表演習・発表 III / Presentation Exercise III	選択/E	1	43	59		
40	論文演習 / Academic Writing Exercise	選択/E	1	43	59		

合計19単位以上 / Total: 19 credits or more

(注) 修士課程で「自然科学総論」を履修していない学生は、履修することが望ましい。

(* It is desirable for students who did not have General Natural Sciences in their Master's program to take the course.

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(B)	(A) (C) (D) (E) (F)
1期	専門科目	数理物質科学特定研究 I (物理学) 数理物質科学演習 I (物理学)
2期	専門科目	数理物質科学特定研究 II (物理学) 研究発表演習・発表 I
3期	専門科目	数理物質科学特定研究 III (物理学) 数理物質科学演習 II (物理学)
4期	専門科目	数理物質科学特定研究 II (物理学) 研究発表演習・発表 II
5期	専門科目	数理物質科学特定研究 III (物理学) 数理物質科学演習 III (物理学)
6期	専門科目	数理物質科学特定研究 III (物理学) 研究発表演習・発表 III, 論文演習

化学コース(D) / Chemistry Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to understand and apply advanced theories and technologies
 - (B-1) The ability to understand at an advanced level and elucidate the reactions and structures of inorganic substances from the atomic and molecular levels
 - (B-2) The ability to understand at an advanced level and elucidate the synthesis methods as well as function, structure and reaction mechanisms of organic compounds
 - (B-3) The ability to understand at an advanced level and elucidate the molecular functions of bio-polymers and functional analyses based on genomic information
 - (B-4) The ability to understand at an advanced level and elucidate the structures and phase transitions of substances on the mesoscale, and more advanced mastery regarding the development of data analysis methods and numeric calculation technologies
 - (B-5) The ability to understand at an advanced level and elucidate the fundamental processes for each quantum state in a range of chemical reactions both theoretically and experimentally, and a more advanced mastery of data analysis methods
- (C) The ability to discover problems and the ability to solve problems
- (D) The ability to effectively communicate
- (E) The ability to give presentations at international conferences, etc.
- (F) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論 II・III・IV・V (*いずれか1科目) /General Natural Sciences II・III・IV・V (*Choose one)	選択/E	1	99	56	(注) 参照/ (*) footnote 必修14単位を含めて、所属コースで開設する科目から14単位以上、他コースまたは他専攻で開設する科目またはキャリアパス形成科目より2単位以上/ 14 or more in the Course incld. 14 in required, and 2 or more in other Courses or Depts or in Career Path Keisei (Development) 課程共通科目 / Doctoral common course 2021年度新設 / New course	他専攻開設 / in other Depts
	(他コース科目 / course(s) in other Courses)	必修/R	2	-	-		
2 (B-1)	溶液内反応特論 / Topics in Chemical Reaction in Solution	選択/E	2	46	59		
	溶液内構造特論 / Structural Aspects in Solution Chemistry	選択/E	2	46	59		
	重元素化学 / Chemistry of Heavy Elements	選択/E	2	46	59		
	放射線計測学 / Radiation Measurement	選択/E	2	46	59		
3 (B-2)	有機物質合成論 / Synthetic Organic Chemistry	選択/E	2	46	59		
	構造活性相関論 / Topics in Structure-Activity Relationships	選択/E	2	46	59		
	酸化還元反応論 / Topics in Oxidation and Reduction Reactions	選択/E	2	46	59		
	不斉有機合成論 / Asymmetric Organic Synthesis	選択/E	2	46	59		
4 (B-3)	細胞機能化学 / Molecular and Cellular Biochemistry	選択/E	2	46	59		
	生理機能化学 / Chemistry of Physiological Function	選択/E	2	46	59		
5 (B-4)	凝縮相構造特論 / Topics in Structure of Condensed Matter	選択/E	2	46	59		
	分子動力学特論 / Molecular Dynamics Simulation	選択/E	2	46	59		
6 (B-5)	化学反応動力学 / Dynamics in Chemical Reaction	選択/E	2	46	59		
	量子反応動力学 / Quantum Reaction Dynamics	選択/E	2	46	59		
7 (A) (C) (D) (E) (F)	数理工学物質科学特定研究 I (化学) / Projective Research in Chemistry I	必修/R	4	46,77	59		
	数理工学物質科学特定研究 II (化学) / Projective Research in Chemistry II	必修/R	4	46,77	59		
	数理工学物質科学特定研究 III (化学) / Projective Research in Chemistry III	選択/E	4	46,77	59		
	数理工学物質科学演習 I (化学) / Seminar in Chemistry I	必修/R	2	46	59		
	数理工学物質科学演習 II (化学) / Seminar in Chemistry II	必修/R	2	46	59		
	数理工学物質科学演習 III (化学) / Seminar in Chemistry III	選択/E	2	46	59		
	研究発表演習・発表 I / Presentation Exercise I	選択/E	1	43	59		
	研究発表演習・発表 II / Presentation Exercise II	選択/E	1	43	59		
	研究発表演習・発表 III / Presentation Exercise III	選択/E	1	43	59		
	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択/E	2	74	39		
論文演習 / Academic Writing Exercise	選択/E	1	43	59			

合計19単位以上 / Total: 19 credits or more

(注) 修士課程で「自然科学総論」を履修していない学生は、履修することが望ましい。

(*) It is desirable for students who did not have General Natural Sciences in their Master's program to take the course.

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(B)	(A) (C) (D) (E) (F)
1期	専門科目	数理工学物質科学特定研究 I (化学)
		数理工学物質科学演習 I (化学)
2期	専門科目	数理工学物質科学特定研究 I (化学)
		研究発表演習・発表 I
3期	専門科目	数理工学物質科学特定研究 II (化学)
		数理工学物質科学演習 II (化学)
4期	専門科目	数理工学物質科学特定研究 II (化学)
		研究発表演習・発表 II
5期	専門科目	数理工学物質科学特定研究 III (化学)
		数理工学物質科学演習 III (化学)
6期	専門科目	数理工学物質科学特定研究 III (化学)
		研究発表演習・発表 III, 論文演習

数理科学コース(D) / Mathematical Science Course (D)

1. コースでの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to use mathematics to elucidate the mathematical structures in the field of information mathematical science as well as complex natural and social phenomena from the perspective of mathematics and information science.
- (C) The ability to understand and apply theories in various fields related to mathematical science and information science, in particular mathematical analysis, structural mathematics, and information mathematics; Development of abilities within one or more of the following three fields
- (C-1) The ability to research and apply knowledge of the structures of function spaces, the structures of the operators thereof, and the structures of rings formed from operators and functions
- (C-2) The ability to research and apply theories in algebraic geometry, number theory, topology, and differential geometry
- (C-3) The ability to research and apply theories in algebra, such as mathematical expression processing, ciphers, codes, etc., theories in mathematical statistics, such as time series analyses, mathematical finance, etc., and theories in information science, such as mathematical planning and optimization theory, including OR, etc.
- (D) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 (B, C, D)	数理物質科学特定研究 I (数理科学) / Projective Research in Mathematical Science I	必修 / R	4	41,77	59	11単位 以上 / 11 or more	
	数理物質科学特定研究 II (数理科学) / Projective Research in Mathematical Science II	必修 / R	4	41,77	59		
	数理物質科学特定研究 III (数理科学) / Projective Research in Mathematical Science III	選択 / E	4	41,77	59		
	数理科学コース演習 / Exercise in Mathematical Science	必修 / R	2	41	59		
	中間発表 / Interim Report	必修 / R	1	77	59		
6 (A, B)	他のコース及び他の専攻で開設する授業科目 / course(s) in other Courses & Depts	必修 / R	2	-	-	2単位以上 / 2 or more	
7 8 9 10 11 12 13 14 15 16 17 (B, C, D)	数理科学博士セミナー I / Seminar in Mathematical Science I	選択 / E	2	41	59	3単位 以上 / 3 or more	
	数理科学博士セミナー II / Seminar in Mathematical Science II	選択 / E	2	41	59		
	数理科学博士セミナー III / Seminar in Mathematical Science III	選択 / E	2	41	59		
	外国語論文解説・討論 I / Literature Reading I	選択 / E	2	99	59		
	外国語論文解説・討論 II / Literature Reading II	選択 / E	2	99	59		
	外国語論文解説・討論 III / Literature Reading III	選択 / E	2	99	59		
	研究発表演習・発表 / Internal and External Presentation	選択 / E	2	99	59		
	作用素環論 / Operator Algebra	選択 / E	2	41	59		
	複素解析学 / Complex Analysis	選択 / E	2	41	59		
	関数空間論 / Function Spaces	選択 / E	2	41	59		
18 19 20 21 (C-1)	偏微分方程式特論 / Advanced Partial Differential Equations	選択 / E	2	41	59	3単位 以上 / 3 or more	
	代数幾何学 / Algebraic Geometry	選択 / E	2	41	59		
	数論 / Number Theory	選択 / E	2	41	59		
	位相幾何学 / Topology	選択 / E	2	41	59		
22 23 24 25 26 (C-2)	微分位相幾何学 / Advanced Differential Topology	選択 / E	2	41	59	3単位 以上 / 3 or more	2021年度新設 / New course
	情報統計学特論 / Advanced Information Statistics	選択 / E	2	41	59		
	最適化特論 / Advanced Theory for Optimization	選択 / E	2	41	59		
	応用統計学特論 / Advanced Applied Statistics	選択 / E	2	41	59		
	数理計画特論 / Advanced Mathematical Programming	選択 / E	2	41	59		
	数理システム特論 / Advanced Theory on Mathematical Systems	選択 / E	2	41	59		
必修13単位, 計19単位以上 / Total: 19 credits or more including 13 credits in required courses							

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

学年	必修科目	選択科目
1年	数理物質科学特定研究 I (数理科学)	専門科目
	数理科学コース演習	
	他コース専門科目	
2年	数理物質科学特定研究 II (数理科学)	専門科目
	中間発表	
3年		専門科目

※2021年度から廃止した科目 「リーマン多様体論」, 「大域微分幾何学」

○材料生産システム専攻(博士後期課程)／Department of Advanced Materials Science and Technology (Doctoral Programs)

機能材料科学コース(D)／Materials Science and Technology Course (D)

1. コースでの教育目標 (人材育成) ／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to discover problems and the ability to solve problems
 (A-1) A mastery of the theories and technologies of materials science, and the ability to develop and apply these in optoelectronic materials, metallic hydrogen system-based materials, and magnetic, superconductive materials, etc.
 (A-2) A mastery of the theories and technologies of materials science, and the ability to develop and apply these in inorganic nanomaterials, hybrid materials, biomaterials, etc.
 (B) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
 (C) The ability to effectively communicate; The ability to give presentations at international conferences, etc.; The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 (A-1)	固体材料物性／Solid State Physics	選択/E	2	54	48	(A-1), (A-2)の いずれかから4単 位以上/ 4 or more in either (A-1) or (A-2)	
	光・電子デバイス材料論／Optoelectronic device materials	選択/E	2	54	48		
	磁性材料特論／Magnetic Materials	選択/E	2	54	49		
	超伝導物性論／Superconductivity	選択/E	2	54	48		
	金属材料電子論／Electronic Properties of Metallic Materials	選択/E	2	54	48		
6 7 8 9 10 11 12 13 (A-2)	機能性無機材料特論／Functions of Inorganic Materials	選択/E	2	54	59		
	光物性化学特論／Photofunctional Chemistry	選択/E	2	54	59		
	ナノ材料化学特論／Nanomaterials Chemistry, Advanced Course	選択/E	2	54	59		
	複合材料設計／Design of Composite Materials	選択/E	2	54	59		
	生物材料設計学／Design of Biomaterials	選択/E	2	54	58		
	生物反応プロセス工学／Biochemical Reaction Engineering	選択/E	2	54	59		
	機能性材料強度特論／Strength of Functional Materials	選択/E	2	54	59		
	ソフトマテリアル工学／Soft Materials Engineering	選択/E	2	56	59		
14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 (B)および(C)	外国語論文解説・討論 I／Colloquia and Discussions for Technical Reading I	選択/E	2	99	59		他コース・他 専攻の専門科目 (選択/必修)4単 位以上を含む、 19単位以上/ 19 or more incld. 4 or more in other Courses or Depts
	外国語論文解説・討論 II／Colloquia and Discussions for Technical Reading II	選択/E	2	99	59		
	外国語論文解説・討論 III／Colloquia and Discussions for Technical Reading III	選択/E	2	99	59		
	材料生産システム博士セミナー I ／ PhD-Course Seminar in Advanced Materials Science and Technology I	選択/E	2	77	59		
	材料生産システム博士セミナー II ／ PhD-Course Seminar in Advanced Materials Science and Technology II	選択/E	2	77	59		
	材料生産システム博士セミナー III ／ PhD-Course Seminar in Advanced Materials Science and Technology III	選択/E	2	77	59		
	材料生産システム博士特定研究 I ／ PhD-Course Project Research in Advanced Materials Science and Technology I	必修/R	4	77	59		
	材料生産システム博士特定研究 II ／ PhD-Course Project Research in Advanced Materials Science and Technology II	必修/R	4	77	59		
	材料生産システム博士特定研究 III ／ PhD-Course Project Research in Advanced Materials Science and Technology III	必修/R	4	77	59		
	他コース・他専攻専門科目 ／ course(s) in other Courses or Depts	選択必修/ ReqE	4以上/ 4 or more	-	-		
	機能材料科学コース演習／PhD-Course Work for Materials Science and Technology	必修/R	2	54	58		
	中間発表／Presentation of Research Progress Report	必修/R	1	77	59		
	研究発表演習・発表／Seminar for Research Presentation	選択/E	2	99	59		
博士のためのインターンシップ／Internship for doctoral courses	選択/E	1	74	49	課程共通科目／Doctoral common course		
博士のためのキャリアマネジメントセミナー ／ Career Management Seminar for doctoral students	選択/E	2	74	39	課程共通科目／Doctoral common course 2021年度新設／New course		
博士のキャリア開発の実践 ／ Practical career development for doctoral students	選択/E	1	74	39	課程共通科目／Doctoral common course 2021年度新設／New course		
博士ジョブ型研究インターンシップ ／ Job-focused research internship for doctoral students	選択/E	2	74	39	課程共通科目／Doctoral common course 2021年度新設／New course		
必修19単位以上 (他コース・他専攻専門科目(選択必修)4単位以上を含む), 選択4単位以上, 総計23単位以上 Total: 23 credits or more including 19 credits or more in required courses (including 4 credits or more in other Courses or Departments (required elective)), and 4 credits or more in elective courses							

3. 必修授業科目履修の流れ (コースワーク)

セメスター	(A-1) (A-2)および(A-3)	(B)および(C)
1期	専門科目 (2科目以上)	材料生産システム博士特定研究 I 材料生産システム博士セミナー I 外国語論文解説・討論 I
2期		機能材料科学コース演習 中間発表 研究発表演習・発表
3期		材料生産システム博士特定研究 II 材料生産システム博士セミナー II 外国語論文解説・討論 II
4期		
5期		材料生産システム博士特定研究 III 材料生産システム博士セミナー III 外国語論文解説・討論 III
6期		

素材生産科学コース(D) / Applied Chemistry and Chemical Engineering Course (D)

1. コースでの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
 (B) A mastery of advanced, specialized knowledge regarding the creation of leading-edge functional substances, the optimization of functions, and the construction of efficient systems to produce them, as well as the ability to discover and solve problems

(B-1) The ability to understand and utilize knowledge regarding the creation of leading-edge functional substances and materials based on designing, synthesizing, and functional analyses at the atomic and

(B-2) The ability to understand and apply knowledge regarding the construction of efficient, ecofriendly production systems and environmental preservation technologies

(C) The ability to effectively communicate, the ability to give presentations at international conferences, etc., and the ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	材料生産システム博士セミナー I / PhD-Course Seminar in Advanced Materials Science and Technology I	選択/E	2	77	59	他コース・他専攻 の専門科目4単位 以上、所属コース の専門科目4単位 以上/ 4 or more in other Courses or Depts & 4 or more in the Course	
2	材料生産システム博士セミナー II / PhD-Course Seminar in Advanced Materials Science and Technology II	選択/E	2	77	59		
3 (B)	材料生産システム博士セミナー III / PhD-Course Seminar in Advanced Materials Science and Technology III	選択/E	2	77	59		
4	他コース・他専攻専門科目 / course(s) in other Courses or Depts	選択必修/ ReqE	4以上/ 4 or more	-	-		
5	精密高分子設計 / Molecular design of well-defined macromolecules	選択/E	2	47	59		
6	素材反応制御化学 / Chemistry for Controlled Material Reaction	選択/E	2	47	59		
7	機能性高分子設計 / Molecular design of functional polymers	選択/E	2	47	59		
8	励起分子変換化学 / Chemistry for Transformation of Excited Organic Molecules	選択/E	2	47	59		
9 (B-1)	素材平衡化学 / Chemical thermodynamics for inorganic materials	選択/E	2	47	59		
10	有機素材合成 / Synthesis of Biologically Active Natural Products	選択/E	2	47	59		
11	無機素材物性解析 / Inorganic solid state chemistry	選択/E	2	47	59		
12	有機素材物性解析 / Structures and Properties of Natural Products	選択/E	2	47	59		
13	素材解析化学 / Material Analysis Chemistry	選択/E	2	47	59		
14	無機材料設計 / Design of Inorganic Materials	選択/E	2	47	59		
15	熱エネルギー材料科学 / Thermal Energy Physics and Chemistry	選択/E	2	47	59		
16 (B-2)	微粒子機能制御論 / Functions and Control of Fine Particulate Materials	選択/E	2	55	59		
17	生産移動現象論 / Mass Transfer in Production Processes	選択/E	2	55	59		
18	材料ライフサイクル工学 / Management of waste materials	選択/E	2	55	59		
19	生物化学工学 / Advanced Biochemical Engineering	選択/E	2	55	59		
20	複合微粒子設計工学特論 / Development of Composite Particles	選択/E	2	55	59		
21	精密粉粒体工学 / Fine Powder Technology	選択/E	2	55	59		
22	生産化学装置論 / Advanced Chemical Materials Production Apparatuses	選択/E	2	55	59		
23	外国語論文解説・討論 I / Colloquia and Discussions for Technical Reading I	選択/E	2	99	59		
24	外国語論文解説・討論 II / Colloquia and Discussions for Technical Reading II	選択/E	2	99	59		
25	外国語論文解説・討論 III / Colloquia and Discussions for Technical Reading III	選択/E	2	99	59		
26	研究発表演習・発表 / Seminar for Research Presentation	選択/E	2	99	59		
27 (C)	材料生産システム博士特定研究 I / PhD-Course Project Research in Advanced Materials Science and Technology I	必修/R	4	77	59	15単位 / 15 or more	
28	材料生産システム博士特定研究 II / PhD-Course Project Research in Advanced Materials Science and Technology II	必修/R	4	77	59		
29	材料生産システム博士特定研究 III / PhD-Course Project Research in Advanced Materials Science and Technology III	必修/R	4	77	59		
30	素材生産科学コース演習 / PhD-Course Work for Applied Chemistry and Chemical Engineering	必修/R	2	47	58		
31	中間発表 / Presentaion of Research Progress Report	必修/R	1	77	59		
必修15単位以上、選択8単位以上 (他コース・他専攻専門科目4単位以上、所属コースの専門科目4単位以上を含む)、総計23単位以上 Total: 23 credits or more including 15 credits or more in required courses and 8 credits or more in elective courses (including 4 credits or more in other Courses or Departments)							

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(A)	(B)	(C)
1期	材料生産システム博士セミナー I	他コース・他専攻専門科目 (専門科目)	材料生産システム博士特定研究 I
2期			素材生産科学コース演習
3期			材料生産システム博士特定研究 II
4期			中間発表
5期			材料生産システム博士特定研究 III
6期			

機械科学コース(D) / Advanced Mechanical Science and Engineering Course(D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity

(B) The ability to discover problems and the ability to solve problems

(B-1) The ability to understand and utilize devices for assessment and analysis, technologies for improving functionality and miniaturization, and medical applications of nanotech and nanobiology

(B-2) The ability to understand comprehensive analyses of the motion characteristics of the mechanical and structural systems comprising production systems, and stability and safety assessment technologies, and the ability to utilize these in design

(B-3) The ability to understand and apply technologies for material plasticity control, microstructure control, and micro-processing, design of micro-mechanical parts, scientific control of material surfaces and interfaces, and low-environmental-burden-type manufacturing technologies

(C) The ability to effectively communicate, the ability to give presentations at international conferences, etc., and the ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes	
1 (A)	材料生産システム博士セミナー I / PhD-Course Seminar in Advanced Materials Science and Technology I	選択/E	2	77	59	他コース・他専攻の 専門科目4単位以上、 所属コースの専門科目4単位以上/ 4 or more in other Courses or Depts & 4 or more in the Course		
2	材料生産システム博士セミナー II / PhD-Course Seminar in Advanced Materials Science and Technology II	選択/E	2	77	59			
3 (B)	材料生産システム博士セミナー III / PhD-Course Seminar in Advanced Materials Science and Technology III	選択/E	2	77	59			
4	他コース・他専攻専門科目 / course(s) in other Courses or Depts	選択必修/ ReqE	4以上/ 4 or more	-	-			
5	知的構造・材料学 / Bionic Design and Materials	選択/E	2	50	59			
6 (B-1)	輸送現象論 / Transport Phenomena in Production	選択/E	2	50	59			
7	複雑流体力学特論 / Complex Fluid Mechanics	選択/E	2	50	59		2021年度新設 / New course	
8	可視化情報計測論 / Flow visualization and image measurement	選択/E	2	50	59			
9	知的ロボット / Intelligent Robotics	選択/E	2	50	59			
10 (B-2)	応用音響学 / Applied Acoustics	選択/E	2	50	59			
11	機械システム制御論 / Control theory for mechanical systems	選択/E	2	50	59			
12	感性ロボットシステム特論 / Advanced KANSEI Microrobotic Systems	選択/E	2	50	59			
13	知的光応用機器論 / Intellectual Applications of Laser Scanning Technology	選択/E	2	50	59			
14	表面設計工学特論 / Advanced Surface Design	選択/E	2	50	59		2021年度新設 / New course	
15 (B-3)	X線材料強度学特論 / X-ray Study of Mechanical Behavior of Materials	選択/E	2	50	59			
16	先端マイクロマシン工学特論 / Advanced Micromachine Engineering	選択/E	2	50	59			
17	接合加工学特論 / Materials Joining and Welding Technology	選択/E	2	50	59			
18	先進環境エネルギー工学特論 / Advanced Environmental Energy Engineering	選択/E	2	50	59			
19	外国語論文解説・討論 I / Colloquia and Discussions for Technical Reading I	選択/E	2	99	59			
20	外国語論文解説・討論 II / Colloquia and Discussions for Technical Reading II	選択/E	2	99	59			
21	外国語論文解説・討論 III / Colloquia and Discussions for Technical Reading III	選択/E	2	99	59			
22	研究発表演習・発表 / Seminar for Research Presentation	選択/E	2	99	59			
23	博士のためのインターンシップ / Internship for doctoral courses	選択/E	1	74	49			
24	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択/E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
25	博士のキャリア開発の実践 / Practical career development for doctoral students	選択/E	1	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
26	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
27	材料生産システム博士特定研究 I / PhD-Course Project Research in Advanced Materials Science and Technology I	必修/R	4	77	59		15単位/ 15 or more	
28	材料生産システム博士特定研究 II / PhD-Course Project Research in Advanced Materials Science and Technology II	必修/R	4	77	59			
29	材料生産システム博士特定研究 III / PhD-Course Project Research in Advanced Materials Science and Technology III	必修/R	4	77	59			
30	機械科学コース演習 / Course Work in Mechanical Science and Engineering	必修/R	2	50	58			
31	中間発表 / Presentation of Research Progress Report	必修/R	1	77	59			
必修15単位以上、選択8単位以上 (他コース・他専攻専門科目4単位以上、所属コースの専門科目4単位以上を含む)、総計23単位以上 Total: 23 credits or more including 15 credits or more in required courses and 8 credits or more in elective courses (including 4 credits or more in other Courses or Departments and 4 credits or more in the Course)								

3. 必修授業科目履修の流れ (コースワーク+リサーチワーク)

セメスター	(A)	(B)	(C)
1期	材料生産システム博士セミナー I	他コース・他専攻専門科目	材料生産システム博士特定研究 I
2期			機械科学コース演習, 専門科目
3期		所属コースの専門科目	材料生産システム博士特定研究 II,
4期			中間発表
5期			材料生産システム博士特定研究 III
6期			

※2021年度から廃止した科目 「複雑性流体工学」, 「デザインシステム論」, 「材料強度評価学」

○電気情報工学専攻(博士後期課程) / Department of Electrical and Information Engineering (Doctoral Programs)

情報工学コース(D) / Information Engineering Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) Development of the following attitudes and positions

- (A-1) An awareness of ethics and responsibilities as an engineer, and the ability to actively lead local communities and the world
- (A-2) The ability to autonomously and continuously engage in study and problem solving in order to develop new understanding and value through higher-level, more advanced research and implementation
- (A-3) Broad, interdisciplinary academic attainments across multiple fields, and the ability to think by tying together diverse ideas

(B) Development of the following general-purpose abilities

- (B-1) The ability to acquire new concepts and perspectives through research and implementation
- (B-2) The ability to model and abstract objects through logical thinking
- (B-3) The ability to discover and solve problems. Also, the ability to think systematically and critically in order to solve problems
- (B-4) The ability to understand papers, manuals, etc. in the fields of science and technology written in English, and the ability to write accurate technical documents in English
- (B-5) The ability to give presentations at international conferences, etc. based on materials
- (B-6) The ability to read, write and communicate in English well enough to work internationally in the specialization
- (B-7) The abilities to accurately convey one's ideas in a discussion and to properly understand the assertions of others. Also, the ability to work smoothly with others with a highly developed sense of ethics

(C) Development of the following field-specific abilities

- (C-1) The high-level, advanced ability to design information structures, design and express calculations, and process large amounts of data
- (C-2) The high-level, advanced ability to make deductions based on formal models, as well as create and operate information-handling machinery
- (C-3) The higher-level, more advanced ability to understand and express the organizations and structures of systems
- (C-4) The ability to create information-handling systems in society and the higher-level, more advanced ability to operate these
- (C-5) The higher-level, more advanced ability to manage the creation of complex systems
- (C-6) The higher-level, more advanced ability to discover and solve information-related problems in society
- (C-7) The higher-level, more advanced ability to actively participate in an information-based society with awareness of general information principles
- (C-8) The higher-level, more advanced ability to detect and comprehend the significance and danger that information presents to individuals and society
- (C-9) The higher-level, more advanced ability to utilize information in compliance with societal rules

(D) Development of the following knowledge and understanding

- (D-1) A mastery of higher-level, more advanced theories relating to the natural sciences such as mathematics, physics, etc.
- (D-2) A mastery of the higher-level, more advanced contents of general information principles
- (D-3) A mastery of the higher-level, more advanced contents of principles of computer-processed information
- (D-4) A mastery of higher-level, more advanced knowledge of computer software and hardware
- (D-5) A mastery of higher-level, more advanced technologies for constructing and utilizing information-handling systems in society

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes	
(A)	情報工学コース演習 / Exercises in Information Engineering	必修 / R	2	49	58	6単位以上 / 6 or more		
	電気情報工学特別講義 / Special lectures on Electrical and Information Engineering	選択 / E	1	99	58			
	他専攻及び他コース専門科目 / course(s) in other Depts & Courses	必修 / R	4	-	-			
	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択 / E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
	博士のキャリア開発の実践 / Practical career development for doctoral students	選択 / E	1	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択 / E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course	
(B), (C)	研究発表演習・発表 / Internal and External Presentation	選択 / E	2	99	59	1単位以上 / 1 or more		
	中間発表 / Interim Report	必修 / R	1	77	59			
	電気情報工学特定研究 I / Project Research in Electrical and Information Engineering I	必修 / R	4	77	59	12単位以上 / 12 or more		
	電気情報工学特定研究 II / Project Research in Electrical and Information Engineering II	必修 / R	4	77	59			
	電気情報工学特定研究 III / Project Research in Electrical and Information Engineering III	必修 / R	4	77	59			
	電気情報工学博士セミナー I / Seminar in Electrical and Information Engineering I	選択 / E	2	49,51,56	59			
	電気情報工学博士セミナー II / Seminar in Electrical and Information Engineering II	選択 / E	2	49,51,56	59			
	電気情報工学博士セミナー III / Seminar in Electrical and Information Engineering III	選択 / E	2	49,51,56	59			
	外国語論文解説・討論 I / Literature Reading I	選択 / E	2	99	59			
	外国語論文解説・討論 II / Literature Reading II	選択 / E	2	99	59			
	外国語論文解説・討論 III / Literature Reading III	選択 / E	2	99	59			
	(C), (D)	移動通信特論 / Advanced Mobile Communications	選択 / E	2	49		58	4単位以上 / 4 or more
リモートセンシング特論 / Remote Sensing		選択 / E	2	49	58			
ワイヤレス情報通信システム特論 / Advanced Wireless Communication Systems		選択 / E	2	49	58			
分散協調メディア特論 / Collaborative and Distributed Media		選択 / E	2	49	58			
空間信号制御特論 / Spatial signal control course		選択 / E	2	49	58			
アルゴリズム特論 / Theory of Algorithms		選択 / E	2	49	58			
データ分析特論 / Advanced Data Analysis		選択 / E	2	49	58			
人間情報科学特論 / Human Information Science		選択 / E	2	49	58			
地理情報・計測システム特論 / GIS and Measuring System		選択 / E	2	49	58			
ゲノム情報解析特論 / Advanced genome informatics		選択 / E	2	49	58			
計算モデル特論 / Advanced Topics in Models of Computation		選択 / E	2	10	58			
情報セキュリティと次世代情報基盤 / Information Security and Intelligent Infrastructure		選択 / E	2	49	58			
センシングデバイス論 / Advanced Sensing Devices		選択 / E	2	49	49	2021年度新設 / New course		
生体電磁論 / Bio-electromagnetics		選択 / E	2	49	59	2021年度新設 / New course		
知能情報機械論 / Intelligent Mechatronics		選択 / E	2	49	49	2021年度新設 / New course		
データサイエンス概論 / Introduction to Data Science		選択 / E	2	10,49	38	課程共通科目 / Doctoral common course		
(D)		応用代数幾何学 / Algebraic geometry and its application	選択 / E	2	49	58		
		数理解析学 / Mathematical Analysis	選択 / E	2	49	58		
		関数解析的群論 / Functional analytic discrete group theory	選択 / E	2	49	58		
		数理システム制御特論 / Mathematical Systems and Control Theory	選択 / E	2	49	58		
	応用偏微分方程式特論 / Applied partial differential equation	選択 / E	2	49	58			

必修19単位, 計23単位以上 / Total: 23 credits or more including 19 credits in required courses

【備考】 「データサイエンス概論」は、博士前期課程で履修していない学生のみ履修可。また、所属コース科目として取り扱う。「博士のためのキャリアマネジメントセミナー」、「博士のキャリア開発の実践」および「博士ジョブ型研究インターンシップ」は所属コース科目として取り扱う。

【Note】 Introduction to Data Science is only for students who did not have the course in their Master's program. It is treated as a course in the Course. Career Management Seminar for Doctoral Students, Practical Career Development for Doctoral Students, and Job-Focused Research Internship for Doctoral Students are treated as courses in the Course.

3. 必修授業科目履修の流れ

セメスター	必修科目(A)	必修科目(B)	必修科目(C)
1期	情報工学コース演習 他専攻科目	電気情報工学特定研究 I	
2期	他専攻科目	電気情報工学特定研究 I	
3期		電気情報工学特定研究 II	中間発表
4期		電気情報工学特定研究 II	
5期		電気情報工学特定研究 III	
6期		電気情報工学特定研究 III	

4. サブプログラム (キャリアパス形成科目群)

自然科学実践論 (1単位), 科学技術英語 I・II (1単位), キャリアパス独自形成特別演習 (2単位)

電気電子工学コース(D) / Electrical and Electronic Engineering Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to understand and apply fundamental theories and technologies relating to electrical and electronic engineering, the natural sciences, and information technology
 - (B-1) The ability to understand and apply fundamental technologies relating to the fields of electrical energy and electronics
 - (B-2) The ability to understand and apply fundamental technologies relating to signal processing, telecommunications systems, optical and measurement control, and applied optics
- (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
(A) (B)	電気電子工学コースセミナー I / Seminar in Electrical and Electronic Engineering Course I	選択/E	2	51	59	6単位以上/ 6 or more	
	電気電子工学コースセミナー II / Seminar in Electrical and Electronic Engineering Course II	選択/E	2	51	59		
	電気電子工学コースセミナー III / Seminar in Electrical and Electronic Engineering Course III	選択/E	2	51	59		
	電気電子工学コース演習 / Exercises in Electrical and Electronic Engineering Course	必修/R	2	51	58		
	外国語論文解説・討論 I / Literature Reading I	選択/E	2	99	59		
	外国語論文解説・討論 II / Literature Reading II	選択/E	2	99	59		
	外国語論文解説・討論 III / Literature Reading III	選択/E	2	99	59		
	電気情報工学特別講義 / Special lectures on Electrical and Information Engineering	選択/E	1	99	58		
	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択/E	2	74	39		課程共通科目(a)/D(a) 2021年度新設 / New course
	博士のキャリア開発の実践 / Practical career development for doctoral students	選択/E	1	74	39		課程共通科目(a)/D(a) 2021年度新設 / New course
	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目(a)/D(a) 2021年度新設 / New course
	他専攻・他コース科目 / course(s) in other Depts or Courses	必修/R	4	-	-		他専攻・他コース/ other Depts or Courses
(B-1)	プラズマエネルギー工学特論 / Plasma processing technology	選択/E	2	51	59	4単位以上/ 4 or more	
	電気磁気エネルギー工学 / Electromagnetic Energy Engineering	選択/E	2	51	59		
	エネルギー応用デバイス / Energy Application Device	選択/E	2	51	59		
	デバイス・エネルギー機器 / Device/Energy Systems	選択/E	2	51	59		
	高電圧パルス工学 / High Voltage Pulse Engineering	選択/E	2	51	59		
	超伝導システム特論 / Superconducting Energy Systems	選択/E	2	51	59		
	ナノフォトニクス特論 / Advanced lecture on nano photonics	選択/E	2	51	59		
	薄膜応用工学 / Thin Films and Application	選択/E	2	51	59		
	半導体デバイス応用特論 / Semiconductor Device Applications	選択/E	2	51	58		2021年度新設 / New course
	分子エレクトロニクス特論 / Molecular Electronics	選択/E	2	51	59		
(B-2)	通信応用システム特論 / Telecommunication Systems and Their Trends and Edges	選択/E	2	51	59		
	薄膜光デバイス / Thin Film Optical Devices	選択/E	2	51	59		
	スペクトル拡散通信論 / Advanced Topics on Spread Spectrum Communications	選択/E	2	51	58		
	多次元信号処理論 / Selected Topics in Multidimensional Signal Processing	選択/E	2	51	58		
	光計測特論 / Optical metrology	選択/E	2	51	58		
	ナノ測定論 / Optical nanometrology	選択/E	2	51	58		
(C)	電気情報工学特定研究 I / Project Research in Electrical and Information Engineering I	必修/R	4	77	59	13単位以上/ 13 or more	
	電気情報工学特定研究 II / Project Research in Electrical and Information Engineering II	必修/R	4	77	59		
	電気情報工学特定研究 III / Project Research in Electrical and Information Engineering III	必修/R	4	77	59		
	研究発表演習・発表 / Internal and External Presentation	選択/E	2	99	58		
	中間発表 / Interim Report	必修/R	1	77	59		

必修19単位, 計23単位以上 / Total: 23 credits or more including 19 credits in required courses

【備考】課程共通科目(a)は, 所属専攻の科目として取り扱う。

【Notes】D(a) indicates Doctor's common courses(a). They are treated as Department courses.

3. 必修授業科目履修の流れ

セメスター	(A)	(A) (B)	(C)
1期	電気電子工学コース演習	コース/課程共通科目 他専攻・他コース科目	電気情報工学特定研究 I
2期		コース/課程共通科目 他専攻・他コース科目	電気情報工学特定研究 I
3期		コース/課程共通科目	電気情報工学特定研究 II 中間発表
4期		コース/課程共通科目	電気情報工学特定研究 II
5期			電気情報工学特定研究 III
6期			電気情報工学特定研究 III

4. サブプログラム (キャリアパス形成科目群)

自然科学実践論 (1単位), 科学技術英語 I・II (1単位), キャリアパス独自形成特別演習 (2単位)

人間支援科学コース(D) / Human Sciences and Assistive Technology Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to be aware of one's social responsibilities with a broad perspective regarding support technology-related fields, including super aged societies, disabilities and disabled individuals, rehabilitation, self-reliance support, self-determination, and societal participation
- (B) The ability to carry out research and development of leading-edge technologies in one of the following engineering fields (information, electronic, and welfare engineering)
- (B-1) The biomedical engineering field as it relates to bio-function sensing and control, human interfaces, medical equipment, and equipment necessary in overcoming and ameliorating disabilities
- (B-2) The lifestyle support science field as it relates to analysis and optimal control of living environments aimed at supporting self-reliance as well as promoting and maintaining health among elderly and disabled individuals, as well as sports science, wellness theory, rehabilitation engineering, conformity theory relating to assistive technologies, etc.
- (C) The ability to discover problems, the ability to formulate problems, and the ability to solve problems; The ability to communicate effectively. The ability to give presentations at international conferences, etc.; The ability to write papers for academic journals, etc.

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1	電気情報工学特定研究 I /Project Research in Electrical and Information Engineering I	必修/R	4	77	59	19単位 以上/ 19 or more	
2	電気情報工学特定研究 II /Project Research in Electrical and Information Engineering II	必修/R	4	77	59		
3	電気情報工学特定研究 III /Project Research in Electrical and Information Engineering III	必修/R	4	77	59		
4	研究発表演習・発表 / Internal and External Presentation	選択/E	2	99	59		学会発表 /academic conference presentation
5	中間発表 / Interim Report	必修/R	1	77	59		
6	人間支援科学コース演習 /Exercises in Human Science and Assistive Technology Course	必修/R	2	56	58		
7	人間支援科学コースセミナー I /Seminar in Human Science and Assistive Technology Course I	選択/E	2	56	59		専攻共通の電気電子工学博士セミナーは履修申請しないこと / Do not register for Seminar in Electrical and Information Engineering, which is a Department common course
8	人間支援科学コースセミナー II /Seminar in Human Science and Assistive Technology Course II	選択/E	2	56	59		
9	人間支援科学コースセミナー III /Seminar in Human Science and Assistive Technology Course III	選択/E	2	56	59		
10	外国語論文解説・討論 I / Literature Reading I	選択/E	2	99	59		
11	外国語論文解説・討論 II / Literature Reading II	選択/E	2	99	59		
12	外国語論文解説・討論 III / Literature Reading III	選択/E	2	99	59		
13	博士のためのキャリアマネジメントセミナー /Career Management Seminar for doctoral students	選択/E	2	74	39		課程共通科目(b) / D(b) 2021年度新設 / New course
14	博士のキャリア開発の実践 /Practical career development for doctoral students	選択/E	1	74	39		課程共通科目(b) / D(b) 2021年度新設 / New course
15	博士ジョブ型研究インターンシップ /Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目(b) / D(b) 2021年度新設 / New course
16	他専攻及び他コース専門科目 / course(s) in other Depts & Course(s)	必修/R	4以上/ 4 or more	-	-		
17	博士のためのインターンシップ / Internship for doctoral courses	選択/E	1	74	49		課程共通科目(b) / D(b)
18	電気情報工学特別講義 /Special lectures on Electrical and Information Engineering	選択/E	1	99	59	4単位 以上/ 4 or more	
19	運動機能生理学 / Motor Functions of the Nervous System	選択/E	2	56	59		
20	先端生体材料論 / Advanced Biomaterials	選択/E	2	56	59		
21	ウェルネス・スポーツ健康論 / Wellness, Sports and Health	選択/E	2	56	59		
22	神経工学特論 / Neuro Engineering	選択/E	2	56	59		
23	生体情報システム論 / Introduction to Cybernetics	選択/E	2	56	49	(B-1)	
24	生体画像信号解析 / Biomedical Signal and Image Processing	選択/E	2	56	59		
25	生体機能解析 / Bioengineering in Functional Activity	選択/E	2	56	49		
26	福祉シミュレーション / Well-being Community Simulation	選択/E	2	56	59	(B-2)	
27	先端支援機器 / Advanced Assistive Device	選択/E	2	56	49		
28	視覚障害支援論 /Assistive Technology for Blind and Visually Impaired People	選択/E	2	56	49		
29	聴覚障害支援論 / Assistive Technology for Auditory Impairment	選択/E	2	56	59		

必修19単位, 計23単位以上 / Total: 23 credits or more including 19 credits in required courses

【備考】課程共通科目(b)は, 所属専攻の科目として取り扱う。

【Notes】D(b) indicates Doctor's common courses(b). They are treated as Department courses.

3. 必修授業科目履修の流れ

セメスター	(A)	(C)
1期	1科目	電気情報工学特定研究 I 人間支援科学コースセミナー I 外国語論文解説・討論 I
2期		研究発表演習
3期	1科目	電気情報工学特定研究 II 人間支援科学コースセミナー II 外国語論文解説・討論 II
4期		人間支援科学コース演習 中間発表
5期		電気情報工学特定研究 III 人間支援科学コースセミナー III 外国語論文解説・討論 III
6期		

4. サブプログラム (キャリアパス形成科目群)

自然科学実践論 (1単位), 科学技術英語 I・II (1単位), キャリアパス独自形成特別演習 (2単位)

※2021年度から廃止した科目 「生体電磁論」, 「知能情報機械論」, 「センシングデバイス論」

○生命・食料科学専攻(博士後期課程)／Department of Environmental Science and Technology (Doctoral Programs)

基礎生命科学コース(D)／Life Sciences Course (D)

1. コースの教育目標 (人材育成) ／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to understand and elucidate theories and technologies in fundamental biology and related fields
 - (B-1) The ability to understand and elucidate fundamental theories relating to immunity, biomolecules, super-molecules and embryogenesis
 - (B-2) The ability to understand and elucidate fundamental theories relating to the structures and functions of organelle, genetics, evolution, and marine organisms
- (C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	(他のコースおよび他の専攻の専門科目 ／course(s) in other Courses & Depts)	必修/R	-	-	-	4単位以上 ／4 or more	
2	博士のためのキャリアマネジメントセミナー ／Career Management Seminar for doctoral students	選択/E	2	74	39	所属コースの 専門科目 5単位以上/ 5 or more in the Course	課程共通科目／Doctoral common course 2021年度新設／New course
3 (B)	博士のキャリア開発の実践 ／Practical career development for doctoral students	選択/E	1	74	39		課程共通科目／Doctoral common course 2021年度新設／New course
4	博士ジョブ型研究インターンシップ ／Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目／Doctoral common course 2021年度新設／New course
5	免疫細胞生物学特論／Advanced Lecture in Cellular Immunobiology	選択/E	2	57	59		
6 (B-1)	細胞分化制御学特論／Topics of Regulation of Cell Differentiation	選択/E	2	57	59		
7	糖鎖科学特論／Advanced Glycoscience	選択/E	2	57	59		
8	タンパク質・核酸化学特論／Advanced protein and nucleic acid chemistry	選択/E	2	57	59		
9	胚発生学特論／Advanced Lecture in Animal Embryology	選択/E	2	57	59		
10	植物機能制御論 I Ⅰ／Plant Function Control I	選択/E	2	57	59		
11	植物機能制御論 II Ⅱ／Plant Function Control II	選択/E	2	57	59		
12 (B-2)	植物機能制御論 III Ⅲ／Plant Function Control III	選択/E	2	57	59		
13	適応統合生物学／Integrative adaptation biology	選択/E	2	57	59		
14	植物分子遺伝学特論 II Ⅱ／Advanced Plant Molecular Genetics II	選択/E	2	57	59		
15	進化発生生物学特論 II Ⅱ／Evolutionary Developmental Biology II	選択/E	2	57	58		
16	水圏生物環境学特論 ／Advanced Lectures in Environmental Aquatic Biology	選択/E	2	57	58		
17	基礎生命科学(博士)演習(中間発表) ／Presentation Practice (Interim Presentation for Doctoral Thesis)	必修/R	1	57,77	59		10単位以上/ 10 or more
18	研究発表(博士)演習(学会発表含む) ／Practice in Research Presentation (Presentation in Scientific Meeting)	必修/R	1	57,77	59		
19	生命・食料科学博士特定研究 I ／Advanced Graduate Study in Life and Food Science I	必修/R	4	77	59		
20	生命・食料科学博士特定研究 II ／Advanced Graduate Study in Life and Food Science II	選択/E	4	77	59		
21 (C)	生命・食料科学博士特定研究 III ／Advanced Graduate Study in Life and Food Science III	選択/E	4	77	59		
22	生命・食料科学博士セミナー I ／Advanced Seminar in Life and Food Science I	必修/R	2	60	59		
23	生命・食料科学博士セミナー II ／Advanced Seminar in Life and Food Science II	選択/E	2	60	59		
24	生命・食料科学博士セミナー III ／Advanced Seminar in Life and Food Science III	選択/E	2	60	59		
25	外国語論文解説・討論 I Ⅰ／Seminar in Current Topics I	必修/R	2	99	59		
26	外国語論文解説・討論 II Ⅱ／Seminar in Current Topics II	選択/E	2	99	59		
27	外国語論文解説・討論 III Ⅲ／Seminar in Current Topics III	選択/E	2	99	59		
19単位以上 (必修14単位) Ⅰ 19 credits or more (14 credits in required courses)							

3. 必修科目履修の流れ

年次	必修科目
1年次	他のコースおよび他専攻の専門科目, 生命・食料科学博士特定研究I, 生命・食料科学博士セミナーI, 外国語論文解説・討論I
2年次	基礎生命科学(博士)演習(中間発表)
3年次	研究発表(博士)演習(学会発表含む)

※2021年度から廃止した科目 「食品産業経営論」, 「経営戦略・マーケティング」

応用生命・食品科学コース(D) / Applied Life and Food Sciences Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity

(B) The ability to formulate and solve problems based on the fundamental theories and technologies of the field concerned

(B-1) The ability to formulate and solve problems aimed at advanced utilization of plant functions, breeding, elucidation of plant physiology, fertilizer design and development of fertilizer technologies by applying theories and technologies relating to plant genome functions and their control, metabolism adjustments, and organelle formation control

(B-2) The ability to formulate and solve problems aimed at improving and advancing microorganism functions, and elucidating enzyme functions by applying theories and technologies relating to microorganism genomic information, function control, and substance production

(B-3) The ability to formulate and solve problems aimed at developing new products and technologies and elucidating food functions by applying theories and technologies relating to food manufacture, processing, component analysis, quality assessment, nutrition and metabolism control, and organism and cell function adjustments

(B-4) The ability to formulate and solve problems aimed at sustainable organism production and Earth environment remediation and maintenance by applying theories and technologies relating to useful functions possessed by soil-dwelling microorganisms, the interactions between microorganisms and plants, and advanced development and utilization of wood resources

(C) The ability to discover and solve problems; The ability to communicate academically; The ability to give presentations at international conferences, etc.; The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	他コースで開講する科目 / course(s) in other Courses	必修 / R	2	-	-	2単位以上 / 2 or more	2単位相当分の科目 / course(s) worth 2 credits
2	Advanced Agri-Communication	選択 / E	1	60	58	4単位以上 / 4 or more	課程共通科目(a) / D(a)
3	Research Agri-Internships	選択 / E	1	60	58		
4	応用生命科学特論 / Advanced in Life Science	選択 / E	1	61	59		
5	食品科学特論 / Advanced in Food Science	選択 / E	1	61	59		
6	バイオインフォマティクス特論 / Bioinformatics	選択 / E	2	61	59		
7	エピジェネティクス特論 / Topics in epigenetics	選択 / E	2	61,57	59		
8	植物代謝制御特論 / Topics in Plant Metabolic Control	選択 / E	2	61,57	59		
9	植物細胞育種学 / Plant Cell Breeding	選択 / E	2	60	59		
10	Environmental Plant Physiology	選択 / E	2	61	59		
11	Topics in Biotechnology and Biochemistry	選択 / E	2	61	59		
12	植物ゲノム機能学特論 / Topics in plant genome function	選択 / E	2	61	59		
13	植物バイオコントロール特論 / Topics in Plant Bio-control	選択 / E	2	61	59		
14	植物環境応答学特論II / Topics in environmental responses of plants II	選択 / E	2	61,57	59		
15	微生物機能化学 / Microbial Chemistry	選択 / E	2	61	59		
16	分子微生物学特論 / Topics in Molecular Microbiology	選択 / E	2	61	59		
17	Topics in Molecular Microbiology	選択 / E	2	61	59		
18	食肉制御論 / Regulation of Meat Property	選択 / E	2	61	59		
19	動物タンパク質機能論 / Topics in Animal Protein Function	選択 / E	2	61,60,57	59		
20	醸造学特論 II / Advanced Zymurgy II	選択 / E	2	61	59		
21	食品・農業情報学特論 / Topics in Food Engineering & Agroinformatics	選択 / E	2	65	48		
22	Topics in Food Sciences	選択 / E	2	61	59		
23	Topics in High Pressure Food Science	選択 / E	2	61	59		
24	食品素材機能論 / Property of Food Materials	選択 / E	2	61	59		
25	食品機能化学特論 / Advanced Biofunctional Chemistry of Food	選択 / E	2	61	59		
26	糖質科学論 / Glycoscience studies	選択 / E	2	61	59		
27	食品工学特論 / Advanced in Food Technology	選択 / E	2	61	59		
28	環境土壌学特論 / Topics in Environmental Soil Science	選択 / E	2	61	59		
29	木質利用化学 / Applied chemistry of wood components	選択 / E	2	61	59		
30	Topics in Applied Bioresource Chemistry	選択 / E	2	61	59		
31	生命・食料科学博士特定研究 I / Advanced Graduate Study in Life and Food Science I	必修 / R	4	77	59		
32	生命・食料科学博士特定研究 II / Advanced Graduate Study in Life and Food Science II	必修 / R	4	77	59		
33	生命・食料科学博士特定研究 III / Advanced Graduate Study in Life and Food Science III	選択 / E	4	77	59		
34	生命・食料科学博士セミナー I / Advanced Seminar in Life and Food Science I	選択 / E	2	60	59		
35	生命・食料科学博士セミナー II / Advanced Seminar in Life and Food Science II	選択 / E	2	60	59		
36	生命・食料科学博士セミナー III / Advanced Seminar in Life and Food Science III	選択 / E	2	60	59		
37	外国語論文解説・討論 I / Seminar in Current Topics I	選択 / E	2	99	59		
38	外国語論文解説・討論 II / Seminar in Current Topics II	選択 / E	2	99	59		
39	外国語論文解説・討論 III / Seminar in Current Topics III	選択 / E	2	99	59		
40	研究発表演習 (中間発表) / Presentation Practice (Interim Presentation for Graduation Thesis)	必修 / R	1	61	59		
41	英語論文作成演習 (英語論文投稿) / Scientific Writing and Presentation in English	選択 / E	1	99	59		
42	応用生命・食品科学演習 (学会発表) / Exercise in Applied Life and Food Sciences	選択 / E	1	61	59		
43	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択 / E	2	74	39		
44	博士のキャリア開発の実践 / Practical career development for doctoral students	選択 / E	1	74	39		
45	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択 / E	2	74	39		

計19単位以上 (必修含め自コースの科目17単位以上、他コース科目2単位以上)
Total: 19 credits or more (17 credits or more in the Course including required courses, and 2 credits or more in other Courses)

課程共通科目(a)は、所属コースの科目として取り扱う。 / D(a) indicates Doctor's common courses(a). They are treated as courses in the Course.

3. 必修科目履修の流れ

セメスター	(A)	(B) (C)	(C)
1期			
2期		生命・食料科学博士特定研究 I (通年)	
3期	他コースで開講する科目		
4期		生命・食料科学博士特定研究 II (通年)	研究発表演習 (中間発表)
5期			
6期			

4. ロシア連邦極東地域における高度農業人材育成プログラム

プログラムの詳細は、●ページを参照してください。

5. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止した科目 「応用生命・食品科学特論」、「食品産業経営論」、「経営戦略・マーケティング」、「植物分子生命科学特論」、「微生物分子生命科学特論」、「食品・栄養科学特論」、「資源利用科学特論」

生物資源科学コース(D)／Agriculture and Bioresources Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

(A) The development of human resources with a profound understanding of life phenomena relating to biological resources, the ability to work as a pioneer and in multifaceted ways to develop new technologies and improve local industries and environments, and who possess a broad perspective regarding nature, society, and humanity

(B) The ability to understand and apply the fundamental theories and technologies of the field concerned

(B-1) The ability to understand and apply theories relating to the development of sustainable agriculture, the development of international agricultural resources that contribute to the revitalization of agriculture-related industries, and administration and management of local agriculture

(B-2) The ability to understand and apply theories in agronomy relating to cultivated plants and resource plants such as edible and horticultural crops, plant physiology and ecosystem sciences, genetics and breeding sciences including propagation, and plant pathology

(B-3) The ability to understand and apply theories relating to safe, effective increases in production of animal protein making use of the genetic diversity as well as the reproductive physiological characteristics, developmental physiological characteristics, and nutritional physiological characteristics of resource animals

(C) The ability to discover and solve problems; The ability to communicate effectively, including academic conference presentations; The ability to report within a specified period of time

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1	他コース科目または課程共通科目 / course(s) in other Courses & Doctor's common course(s)	必修/R	-	-	-	4単位以上/ 4 or more	
2	生物資源科学コース演習 I / Seminar on Agriculture and Bioresources I	必修/R	1	60	58	1単位以上/ 1 or more	
3	生物資源科学コース演習 II / Seminar on Agriculture and Bioresources II	選択/E	1	60	58		
4	生物資源科学特論 / Special Lecture on Agriculture and Bioresources	選択/E	1	60,66	58		
5	A Global Perspective and Invigorating Assistance on Agriculture	選択/E	1	60	58		課程共通科目(a)/D(a)
6	Advanced Agri-Communication	選択/E	1	60	58		課程共通科目(a)/D(a)
7	(B) Topics in Agro-Resources Science	選択/E	2	60	59	6単位以上/ 6 or more	
8	国際農業資源開発論 / International Agriculture and Resources Development	選択/E	2	64	59		※修了要件に含まれるのは、どちらか1科目のみです。
9	国際農業資源開発論 / International Agriculture and Resources Development	選択/E	2	64	59		
10	農業生産力論 / Analysis of Agricultural Productivity	選択/E	2	64	59		
11	植物発育制御学 / Plant Development Regulation	選択/E	2	60	59		
12	ゲノム解析学 / Plant Genome Analysis	選択/E	2	60	59		
13	Plant Genome Analysis	選択/E	2	60	59		※修了要件に含まれるのは、どちらか1科目のみです。
14	農作業システム特論 / Special Lecture of Farming System	選択/E	2	60	59		
15	比較ウイルス学 / Comparative Virology	選択/E	2	60	59		
16	作物ゲノム学 / Crop genomics	選択/E	2	60	59		
17	草地植生利用管理学 / Grassland Vegetation, its Management and Utilization	選択/E	2	66	58		
18	(B-3) 動物遺伝解析学 / Genetic analysis in animals	選択/E	2	66	59		
19	動物組織細胞化学論 / Animal Histochemistry and Cytochemistry	選択/E	2	66	59		
20	動物生殖細胞制御学 / Animal Germ Cell Regulation	選択/E	2	60	48		
21	生命・食料科学博士特定研究 I / Advanced Graduate Study in Life and Food Science I	必修/R	4	77	59	必修 8単位以上/ 8 or more in required courses	
22	生命・食料科学博士特定研究 II / Advanced Graduate Study in Life and Food Science II	選択/E	4	77	59		
23	生命・食料科学博士特定研究 III / Advanced Graduate Study in Life and Food Science III	選択/E	4	77	59		
24	生命・食料科学博士セミナー I / Advanced Seminar in Life and Food Science I	必修/R	2	60	59		
25	生命・食料科学博士セミナー II / Advanced Seminar in Life and Food Science II	選択/E	2	60	59		
26	生命・食料科学博士セミナー III / Advanced Seminar in Life and Food Science III	選択/E	2	60	59		
27	外国語論文解説・討論 I / Seminar in Current Topics I	必修/R	2	99	59		
28	外国語論文解説・討論 II / Seminar in Current Topics II	選択/E	2	99	59		
29	外国語論文解説・討論 III / Seminar in Current Topics III	選択/E	2	99	59		
30	Research Agri-Internships	選択/E	1	60	58		
31	Practical English	選択/E	1	99	59		
32	英語論文作成演習 (英語論文投稿) / Scientific Writing and Presentation in English	選択/E	1	99	59		
33	リサーチコミュニケーション演習 (国際学会発表) / Research Communication	選択/E	1	99	59		
計19単位以上 (必修含め自コースの科目15単位以上, 他コース科目4単位以上)							
Total 19 credits or more (15 credits or more in the Course including required courses, 4 credits or more in other Courses)							

3. 授業科目履修の流れ (コースワーク)

セメスター	(A)	(B)	(C)	
			選択・必修	選択
1期	(※1) 生物資源科学コース演習 I	専門科目	(※1) 生命・食料科学博士特定研究 I	生命・食料科学博士セミナー I 外国語論文解説・討論 I
2期				
3期	(※1) 生物資源科学コース演習 II		(※1) 生命・食料科学博士特定研究 II	生命・食料科学博士セミナー II 外国語論文解説・討論 II
4期				
5期			(※1) 生命・食料科学博士特定研究 III	生命・食料科学博士セミナー III 外国語論文解説・討論 III
6期				

(※1) はコースワーク

4. ロシア連邦極東地域における高度農業人材育成プログラム

プログラムの詳細は、●ページを参照してください。

5. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止した科目 「食品産業経営論」、「経営戦略・マーケティング」、「地域食品産業特論」、「作物資源利用学」、「農業資源科学特論」、「Nutritional Regulation of Protein (Amino Acids) Metabolism in Monogastric Animals」

○環境科学専攻(博士後期課程)／Department of Environmental Science and Technology (Doctoral Programs)

自然システム科学コース(D)／Natural Environmental Science Course (D)

1. コースの教育目標 (人材育成) ／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to discover problems and the ability to solve problems
- (C) The ability to effectively communicate
- (D) The ability to give presentations at international conferences, etc.
- (E) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 (A)	他コース専門科目 ／course(s) in other Courses	選択必修 ReqE	4以上 4 or more	-	-	4単位以上 4 or more	
	博士のためのキャリアマネジメントセミナー ／Career Management Seminar for doctoral students	選択/E	2	74	39		課程共通科目／Doctoral common course 2021年度新設／New course
	博士のキャリア開発の実践 ／Practical career development for doctoral students	選択/E	1	74	39		課程共通科目／Doctoral common course 2021年度新設／New course
	博士ジョブ型研究インターンシップ ／Job-focused research internship for doctoral students	選択/E	2	74	39		課程共通科目／Doctoral common course 2021年度新設／New course
5 6 7 8 9 10 11 12 13 14 15 16 17 18 (B)	環境物理学特論 I ／Environmental Physics I	選択/E	2	43	48	10単位以上 (4単位は 特定研究)／ 10 or more (4 in Project Research)	ただし、研究指導委員会が認めた他コースまたは他専攻の科目を、当該分野の専門科目として認定可とする。／ Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B)
	環境物理学特論 II ／Environmental Physics II	選択/E	2	43	48		
	環境化学特論 I ／Advanced Chemistry of the Environment I	選択/E	2	46	48		
	環境化学特論 II ／Advanced Chemistry of the Environment II	選択/E	2	46	48		
	環境化学特論 IV ／Topics in Environmental Chemistry IV	選択/E	2	46	48		
	環境化学特論 V ／Advanced Chemistry of the Environment V	選択/E	2	46	48		
	地球物理学特論 I ／Advanced Course in Geophysics I	選択/E	2	43	48		
	地圏環境科学特論 I ／Special Lecture of Earth Surface Environment I	選択/E	2	44	48		
	機能形態学特論 ／Structure and Function	選択/E	2	57	48		
	多様性生物学特論 I ／Biological Diversity I	選択/E	2	57	48		
	多様性生物学特論 II ／Biological Diversity II	選択/E	2	57	48		
	多様性生物学特論 III ／Biological Diversity III	選択/E	2	57	48		
	保全生物学特論 I ／Conservation Biology I	選択/E	2	57	48		
	保全生物学特論 III ／Conservation Biology III	選択/E	2	57	48		
19 20 21	環境科学特定研究 ／Project Research in Environmental Science and Technology	必修/R	4	77	59		
	大気汚染影響評価学特論 ／Advanced impact assessment of air pollution	選択/E	2	46	38		
	大気汚染物質科学特論 ／Advanced atmospheric pollutant sciences	選択/E	2	46	38		
22 23 24 (C) (D) (E)	環境科学演習 I ／Seminar in Environmental Science and Technology I	必修/R	1	77	59	1単位以上 1 or more	
	海外研究プロジェクト特別演習 ／Project Research Exercise on Abroad	選択/E	1	99	58		
	ISI誌投稿特別演習 ／ISI Journal Submission Exercise	選択/E	1	99	58		

修得単位：必修5単位、選択必修10単位以上修得のうえ、合計19単位以上修得のこと。

Credits Required: Total 19 credits or more including 5 credits in required courses and 10 credits or more in required elective courses

3. 必修授業科目履修の流れ(目安)

セメスター	(A) + (B)	(B) (C) (D) (E)
1	所属コース専門科目 (1科目) 他コース専門科目 (1科目)	
2	所属コース専門科目 (1科目) 他コース専門科目 (1科目)	環境科学演習 I
3	所属コース専門科目 (1科目)	環境科学特定研究
4		
5		
6		

※2021年度から廃止または削除した科目 「環境科学特別講義」, 「環境化学特論III」, 「地圏環境科学特論II」, 「多様性生物学特論IV」, 「保全生物学特論II」, 「地球物理学特論II」

流域環境学コース(D)／Environmental Science for Agriculture and Forestry Course (D)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
 (B) The ability to discover problems and the ability to solve problems
 (C) The ability to effectively communicate
 (D) The ability to give presentations at international conferences, etc.
 (E) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 (A)	他コース専門科目／course(s) in other Courses	選択必修 ReqE	4以上 4 or more	-	-	4単位以上 4 or more	
	博士のためのインターンシップ／Internship for doctoral courses	選択／E	1	74	49		* 課程共通科目 ／Doctral common course
	博士のためのキャリアマネジメントセミナー ／Career Management Seminar for doctoral students	選択／E	2	74	39		課程共通科目／Doctral common course 2021年度新設／New course
	博士のキャリア開発の実践 ／Practical career development for doctoral students	選択／E	1	74	39		課程共通科目／Doctral common course 2021年度新設／New course
	博士ジョブ型研究インターンシップ ／Job-focused research internship for doctoral students	選択／E	2	74	39		課程共通科目／Doctral common course 2021年度新設／New course
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 (B)	森林生態系管理学Ⅰ／Forest Ecosystem Management I	選択／E	2	62	58	10単位以上 (4単位は 特定研究)／ 10 or more (4 in Project Research)	ただし、研究指導委員会が認めた他コースまたは他専攻の科目を、当該分野の専門科目として認定可とする。／ Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count as courses in the Course. 2021年名称変更／New title
	森林生態系管理学Ⅱ／Forest Ecosystem Management II	選択／E	2	62	58		
	森林環境物理学／Environmental Biophysics	選択／E	2	62	58		
	森林空間情報学／Forest Geoinformatics	選択／E	2	62	58		
	農地・農村計画学Ⅰ ／Design and Management of Agricultural Land and Rural Community I	選択／E	2	65	58		
	施設機能工学／Design of Hydraulic Structures	選択／E	2	65	58		
	生産システム工学／Systems Engineering for Agricultural Production	選択／E	2	65	58		
	食品・農業情報学特論 ／Topics in Food Engineering & Agroinformatics	選択／E	2	65	48		
	応用雪水文学／Applied Snow Hydrology	選択／E	2	62	58		
	農業水利調整学／Advanced Agricultural Water Management	選択／E	2	65	58		
	生態系機能学／Ecosystem Function	選択／E	2	62	58		
	大気汚染影響評価学特論 ／Advanced impact assessment of air pollution	選択／E	2	46	38		
	大気汚染物質科学特論 ／Advanced atmospheric pollutant sciences	選択／E	2	46	38		
	農業環境システム論／Agricultural Environmental Systems	選択／E	2	65	58		
	生態遺伝管理学特論Ⅰ／Advanced Ecological Genetics I	選択／E	2	57	58		
	生態遺伝管理学特論Ⅱ／Advanced Ecological Genetics II	選択／E	2	57	58		
	島嶼生物地理学／Island Biogeography	選択／E	2	57	58		
	淡水生物学特論／Freshwater Biology	選択／E	2	57	58		
	環境保全の合意形成論 ／Consensus Building for Watershed Management	選択／E	2	38	38		
環境科学特定研究 ／Project Research in Environmental Science and Technology	必修／R	4	77	59			
26 27 28 (C) (D) (E)	環境科学演習Ⅱ ／Seminar in Environmental Science and Technology II	必修／R	1	99	59	1単位以上 1 or more	
	海外研究プロジェクト特別演習 ／Project Research Exercise on Abroad	選択／E	1	99	58		
	ISI誌投稿特別演習 ／ISI Journal Submission Exercise	選択／E	1	99	58		
修得単位：必修5単位，選択必修10単位以上修得のうえ，合計19単位以上修得のこと。 Credits Required: Total 19 credits or more including 5 credits in required courses and 10 credits or more in required elective courses							

3. 必修授業科目履修の流れ（目安）

セメスター	(A) + (B)	(B) (C) (D) (E)
1	所属コース専門科目 (1科目)	
	他コース専門科目 (1科目)	
2	所属コース専門科目 (1科目)	環境科学演習Ⅱ
	他コース専門科目 (1科目)	
3	所属コース専門科目 (1科目)	環境科学特定研究
4		
5		
6		

4. ロシア連邦極東地域における高度農業人材育成プログラム

プログラムの詳細は、●ページを参照してください。

5. グローバル農力養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

※2021年度から廃止または名称変更した科目 「環境科学特別講義」，「森林生態系管理学Ⅲ」，「農業情報学特論」

社会基盤・建築学コース(社会基盤系) (D) / Architecture and Civil Engineering Course (Civil Engineering Kei) (D)

1. コースの教育目標(人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to discover problems and the ability to solve problems
- (C) The ability to effectively communicate
- (D) The ability to give presentations at international conferences, etc.
- (E) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 (A)	他コース専門科目 / course(s) in other Courses	選択必修 ReqE	4以上 4 or more	-	-	4単位以上 4 or more	課程共通科目 / Doctoral common course 2021年度新設 / New course
	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択 / E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
	博士のキャリア開発の実践 / Practical career development for doctoral students	選択 / E	1	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択 / E	2	74	39		課程共通科目 / Doctoral common course 2021年度新設 / New course
5 6 7 8 9 10 11 12 13 14 15 (B)	構造システム論 I / Structural systems I	選択 / E	2	53	59	10単位以上 (4単位は 特定研究) / 10 or more (4 in Project Research)	ただし、研究指導委員会が 認めた他コース(※)または他 専攻の科目を、当該分野の 専門科目として認定可とする。 / Courses in other Courses(※) or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B).
	構造システム論 II / Structural systems II	選択 / E	2	53	59		
	構造システム論 III / Structural systems III	選択 / E	2	53	59		
	建設構造材料論 I / Structural Mechanics and Computational Methods I	選択 / E	2	52	59		
	建設構造材料論 II / Structural Mechanics and Computational Methods II	選択 / E	2	52	59		
	地盤防災論 / Geotechnical disaster management	選択 / E	2	52	59		
	都市水質リスク学 / Risk Management of Urban Water Quality	選択 / E	2	52	59		
	沿岸環境防災論 / Nearshore Dynamics and Disaster Mitigation	選択 / E	2	52	59		
	環境材料論 / Materials for Construction and Environment	選択 / E	2	52	59		
	環境・災害モデリング / Numerical modeling for civil and environmental engineering	選択 / E	2	52	59		
環境科学特定研究 / Project Research in Environmental Science and Technology	必修 / R	4	77	59			
16 17 18 (C) (D) (E)	環境科学演習 III / Seminar in Environmental Science and Technology III	必修 / R	1	77	59	1単位以上 1 or more	
	海外研究プロジェクト特別演習 / Project Research Exercise on Abroad	選択 / E	1	99	58		
	ISI誌投稿特別演習 / ISI Journal Submission Exercise	選択 / E	1	99	58		
修得単位: 必修5単位, 選択必修10単位以上修得のうえ, 合計19単位以上修得のこと。 Credits Required: Total 19 credits or more including 5 credits in required courses and 10 credits or more in required elective courses							

※「他コースの科目」には、社会基盤・建築学コースの他分野で開設する科目も含む。

※ "Course(s) in other Courses" include those in the other section, *kei*, in the Architecture and Civil Engineering Course.

3. 必修授業科目履修の流れ(目安)

セメスター	(A) + (B)	(B) (C) (D) (E)
1	所属コース専門科目 (1科目)	
	他コース専門科目 (1科目)	
2	所属コース専門科目 (1科目)	環境科学演習 III
	他コース専門科目 (1科目)	
3	所属コース専門科目 (1科目)	環境科学特定研究
4		
5		
6		

※2021年度から廃止した科目 「環境科学特別講義」

社会基盤・建築学コース(建築系)(D) / Architecture and Civil Engineering Course (Architecture Kei) (D)

1. コースの教育目標(人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
- (B) The ability to discover problems and the ability to solve problems
- (C) The ability to effectively communicate
- (D) The ability to give presentations at international conferences, etc.
- (E) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes	
1 (A)	他コース専門科目 / course(s) in other Courses	選択必修 / ReqE	4以上	-	-	4単位以上 / 4 or more		
2	構造システム論Ⅰ / Structural systems I	選択 / E	2	53	59	10単位以上 (4単位は 特定研究) / 10 or more (4 in Project Research)	ただし、研究指導委員会が認めた他コース(※)または他専攻の科目を、当該分野の専門科目として認定可とする。 / Courses in other Courses (※) or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B). 2021年名称変更 / New title	
3	構造システム論Ⅱ / Structural systems II	選択 / E	2	53	59			
4	構造システム論Ⅲ / Structural systems III	選択 / E	2	53	59			
5	建設構造材料論Ⅰ / Structural Mechanics and Computational Methods I	選択 / E	2	52	59			
6	建設構造材料論Ⅱ / Structural Mechanics and Computational Methods II	選択 / E	2	52	59			
7	地盤防災論 / Geotechnical disaster management	選択 / E	2	52	59			
8	居住環境論 / Design theories for dwelling place	選択 / E	2	53	59			
9	建築環境制御論Ⅰ / Control of Architectural and Urban Environment I	選択 / E	2	53	59			
10	建築環境制御論Ⅱ / Control of Architectural and Urban Environment II	選択 / E	2	53	59			
11	景観計画論 / Landscape Planning Theory	選択 / E	2	53	59			
12	都市保全計画論 / Urban Conservation Planning	選択 / E	2	53	59			
13	環境科学特定研究 / Project Research in Environmental Science and Technology	必修 / R	4	77	59			2021年度新設 / New course
14	環境科学演習Ⅲ / Seminar in Environmental Science and Technology III	必修 / R	1	77	59			1単位以上 / 1 or more
15	海外研究プロジェクト特別演習 / Project Research Exercise on Abroad	選択 / E	1	99	58			
16	ISI誌投稿特別演習 / ISI Journal Submission Exercise	選択 / E	1	99	58			
17 (C) (D) (E)	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択 / E	2	74	39			
18	博士のキャリア開発の実践 / Practical career development for doctoral students	選択 / E	1	74	39			
19	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択 / E	2	74	39	課程共通科目 / Doctoral common course 2021年度新設 / New course		
修得単位：必修5単位、選択必修10単位以上修得のうえ、合計19単位以上修得のこと。 Credits Required: Total 19 credits or more including 5 credits in required courses and 10 credits or more in required elective courses								

※「他コースの科目」には、社会基盤・建築学コースの他分野で開設する科目も含む。

※ "Course(s) in other Courses" include those in the other section, kei, in the Architecture and Civil Engineering Course.

3. 必修授業科目履修の流れ(目安)

セメスター	(A) + (B)	(B) (C) (D) (E)
1	所属コース専門科目(1科目)	
	他コース専門科目(1科目)	
2	所属コース専門科目(1科目)	環境科学演習Ⅲ
	他コース専門科目(1科目)	
3	所属コース専門科目(1科目)	
4		環境科学特定研究
5		
6		

※2021年度から廃止および名称変更した科目 「環境科学特別講義」, 「居住空間論Ⅱ」

地球科学コース(D) / Earth Science Course (D)

1. コースの教育目標(人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, ethics and humanity
- (B) The ability to understand and apply advanced theories and technologies
 - (B-1) The ability to elucidate the formative processes of earth substances using isotope petrology and chronological methods
 - (B-2) The ability to elucidate the properties of crust and mantle substances as well as their formations, changes, and interrelations
 - (B-3) The ability to elucidate global environmental changes since the creation of the Earth at various time scales
- (C) The ability to discover problems and the ability to solve problems
- (D) The ability to effectively communicate
- (E) The ability to give presentations at international conferences, etc.
- (F) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 (A)	自然科学総論 I・II・III・IV(いずれか1科目) /General Natural Sciences I・II・III・IV(Choose one)	選択/E	1	99	56	(注)参照/ (*) footnote	他専攻/in other Depts
2	岩圈物質変遷論 /Lithospheric Dynamics	選択/E	2	44	59	2単位以上 / 2 or more	
3 (B-1)	鉱物科学特論 /Advanced Mineralogical Sciences	選択/E	2	44	59		
4	同位体地質学 /Isotope Geology	選択/E	2	44	59		
5	島弧火山学 /Arc volcanology	選択/E	2	44	59		
6	岩圈変形論 /Deformation of Lithosphere	選択/E	2	44	59		
7 (B-2)	地球深部物質論 /Theory of Deep Materials in the Earth	選択/E	2	44	59		
8	断層物質科学 /Fault Material Science	選択/E	2	44	59		
9	古生物地理論 /Paleobiogeography	選択/E	2	44	59		
10	表層物質堆積論 /Sedimentology of Clastic Materials	選択/E	2	44	59		
11 (B-3)	地圏環境進化学 /Geosphere environment evolutionary	選択/E	2	44	59		
12	地球-生命共進化論 /Co-evolution of Earth and Life	選択/E	2	44	59		
13	微化石層序論 /Microfossil biostratigraphy	選択/E	2	44	59		
14 (A)	(他コース科目 /course(s) in other Courses)	必修/R	4	-	-		
15	中間発表D /Presentation of Research Progress Report D	必修/R	1	77	59	18単位以上(他コースまたは他専攻で開設する科目より4単位以上を含む) *1:選択必修 「学術発表演習D」又は「地球科学演習D」のいずれか *2:選択必修 「論文作成演習D」又は「地球科学特定研究Dc」のいずれか 18 or more (incl 4 or more in other Courses or Depts) *1 Required Elective - Presentation Exercise D or Seminar in Earth Science D *2 Required Elective - Academic Writing Exercise D or Project Research in Earth Science Dc	
16	学術発表演習D /Presentation Exercise D	選択必修/ ReqE	1	44	59		*1
17	地球科学演習D /Seminar in Earth Science D		1	44	59		
18	論文作成演習D /Academic Writing Exercise D	選択必修/ ReqE	4	44	59		*2
19 (A) (C) (D) (E) (F)	地球科学特定研究Dc /Project Research in Earth Science Dc		4	77	59		
20	地質エンジニアリング実習D /Geological Engineering Exercise D	選択/E	2	44	59		
21	サイエンスコミュニケーション実習D /Science Communication Exercise D	選択/E	2	44	59		
22	地球科学特定研究Da /Project Research in Earth Science Da	必修/R	4	77	59		
23	地球科学特定研究Db /Project Research in Earth Science Db	必修/R	4	77	59		
合計19単位以上 / Total: 19 credits or more							

(注) 修士課程で「自然科学総論」を履修していない学生は、履修することが望ましい。

(*) It is desirable for students who did not have General Natural Sciences in their Master's program to take the course.

3. 必修授業科目履修の流れ(コースワーク+リサーチワーク)

セメスター	(B)	(A) (C) (D) (E) (F)
1期	専門科目	地球科学特定研究Da 地球科学演習D
2期	専門科目	地球科学特定研究Da 地球科学演習D
3期	専門科目	地球科学特定研究Db 地球科学演習D, 中間発表D
4期	専門科目	地球科学特定研究Db 地球科学演習D
5期	専門科目	地球科学特定研究Dc 地球科学演習D
6期	専門科目	地球科学特定研究Dc 地球科学演習D

4. キャリアパス形成に関連した科目群 (紹介)

キャリアパス形成に関連し、下記の課程共通科目が開講されています。(修了要件対象外)

- 博士のためのキャリアマネジメントセミナー (2単位)
- 博士のキャリア開発の実践 (1単位)
- 博士ジョブ型研究インターンシップ (2単位)

※2021年度から廃止した科目 「環境科学特別講義」

災害環境科学コース(D)／Natural Disaster and Environmental Science Course (D)

1. コースの教育目標（人材育成）／Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities with a broad perspective toward nature, society and humanity
 (B) The ability to discover problems and the ability to solve problems
 (C) The ability to effectively communicate
 (D) The ability to give presentations at international conferences, etc.
 (E) The ability to write papers for academic journals

2. 達成目標に対応した授業科目と分野・水準／Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1	他コース専門科目／course(s) in other Depts	選択必修／ ReqE	4以上／4 or more	-	-	4単位以上／ 4 or more	
2	大気汚染影響評価学特論／ Advanced impact assessment of air pollution	選択／E	2	46	38		専攻共通科目／ Dept common course
3	大気汚染物質科学特論／ Advanced atmospheric pollutant sciences	選択／E	2	46	38		専攻共通科目／ Dept common course
4	博士のためのインターンシップ／ Internship for doctoral courses	選択／E	1	74	49		課程共通科目／ Doctoral common course
5	雪氷災害特論／Topics in Snow and Ice Disasters	選択必修／ ReqE	2	44	58	10単位以上 (4単位は 特定研究)／ 10 or more (4 in Project Research)	ただし、研究指導委員会 が認めた他コースまたは 他専攻の科目を、当該分 野の専門科目として認定 可とする。／Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B).
6	地盤変動特論／Active Geological Processes	選択必修／ ReqE	2	44	58		
7	斜面災害特論 I／Disasters by Slope Movements	選択必修／ ReqE	2	44,52,62	58		
8	斜面災害特論 II／Hazards by Slope Movement II	選択必修／ ReqE	2	44,52	58		
9	火山土砂災害特論／ Advanced topics in volcano-hydrologic hazards	選択必修／ ReqE	2	44	58		
10	数値河川水理学特論／Numerical Hydrodynamics	選択必修／ ReqE	2	52	58		
11	環境科学特定研究／ Project Research in Environmental Science and Technology	必修／R	4	77	59		
12	環境科学演習 I／ Seminar in Environmental Science and Technology I	必修／R	1	77	59	1単位以上／ 1 or more	
13	海外研究プロジェクト特別演習／ Project Research Exercise on Abroad	選択／E	1	99	58		
14	ISI誌投稿特別演習／ISI Journal Submission Exercise	選択／E	1	99	58		
修得単位：必修5単位，選択必修10単位以上修得のうえ，合計19単位以上修得のこと。 Credits Required: Total 19 credits or more including 5 credits or more in required courses and 10 or more in required elective courses							

3. 必修授業科目履修の流れ（目安）

セメスター	(A) + (B)	(B) (C) (D) (E)
1	所属コース専門科目 (1科目)	他コース専門科目 (1科目)
2	所属コース専門科目 (1科目)	他コース専門科目 (1科目)
3	所属コース専門科目 (1科目)	環境科学演習 I 環境科学特定研究
4		
5		
6		

4. グローバル農力養成プログラム及びグローバル防災・復興プログラム プログラムの詳細は、●ページを参照してください。

※2021年度から廃止した科目 「環境科学特別講義」

フィールド科学コース(D) / Field Research in the Environmental Sciences Course (D)

1. コースの教育目標 (人材育成) / Educational Objectives of the Course (Human Resource Development)

- (A) The ability to recognize one's responsibilities and make ethical judgements, at a higher level, regarding nature, society and humanity
- (B) The ability to discover and solve problems at a high level through the state-of-the-art, field-specific knowledge and understanding
- (C) The ability to coordinate solutions to various issues from a neutral standpoint
- (D) The ability to communicate effectively, including international conference presentations
- (E) The ability to write papers for academic, refereed journals

2. 達成目標に対応した授業科目と分野・水準 / Courses, Fields, and Standards Corresponding to the Objectives

達成目標 Objective	授業科目 Course Title	選択・必修 Elective/Req	単位数 Credits	分野 Field	水準 Standard	修了認定単位 Credit Req for Degree	備考 Notes
1 2 3 4 5 6 (A) (B) (C)	博士のためのインターンシップ / Internship for doctoral courses	選択 / E	1	74	49	4単位以上 / 4 or more	課程共通科目 / Doctral common course
	博士のキャリア開発の実践 / Practical career development for doctoral students	選択 / E	1	74	39		課程共通科目 / Doctral common course
	博士ジョブ型研究インターンシップ / Job-focused research internship for doctoral students	選択 / E	2	74	39		課程共通科目 / Doctral common course
	環境ファシリテーター論及び演習 / Environmental Facilitator Theory	必修 / R	2	99	58		
	博士のためのキャリアマネジメントセミナー / Career Management Seminar for doctoral students	選択必修 / ReqE	2	74	39		課程共通科目 / Doctral common course
	他コース専門科目 / course(s) in other Courses		2	-	-		
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 (B)	森林生態系管理学 I / Forest Ecosystem Management I	選択 / E	2	62	58	10単位以上 (4単位は 特定研究) / 10 or more (4 in Project Research)	ただし、研究指導 委員会が認めた他 コースまたは他専 攻の科目を、当該 分野の専門科目と して認定可とする。 / Courses in other Courses or Depts that are approved by the Kenkyu Shido (Research Advising) Committee may count toward (B)
	森林生態系管理学 II / Forest Ecosystem Management II	選択 / E	2	62	58		
	生態遺伝管理学特論 I / Advanced Ecological Genetics I	選択 / E	2	57	58		
	適応統合生物学 / Integrative adaptation biology	選択 / E	2	57	58		
	水圏生物環境学特論 / Advanced Lectures in Environmental Aquatic Biology	選択 / E	2	57	58		
	生態遺伝管理学特論 II / Advanced Ecological Genetics II	選択 / E	2	57	58		
	多様性生物学特論 III / Biological Diversity III	選択 / E	2	57	48		
	多様性生物学特論 IV / Biological Diversity IV	選択 / E	2	57	48		
	保全生物学特論 II / Conservation Biology II	選択 / E	2	57	48		
	淡水生物学特論 / Freshwater Biology	選択 / E	2	57	58		
	島嶼生物地理学 / Island Biogeography	選択 / E	2	57	58		
	環境保全の合意形成論 / Consensus Building for Watershed Management	選択 / E	2	99	38		
	森林空間情報学 / Forest Geoinformatics	選択 / E	2	62	58		
	応用雪水文学 / Applied Snow Hydrology	選択 / E	2	62	58		
	生態系機能学 / Ecosystem Function	選択 / E	2	62	58		
	大気汚染影響評価学特論 / Advanced impact assessment of air pollution	選択 / E	2	46	38		
	大気汚染物質科学特論 / Advanced atmospheric pollutant sciences	選択 / E	2	46	38		
	地球物理学特論 I / Advanced Course in Geophysics I	選択 / E	2	43	48		
	環境化学特論 II / Advanced Chemistry of the Environment II	選択 / E	2	46	48		
	環境化学特論 IV / Topics in Environmental Chemistry IV	選択 / E	2	46	48		
	地圏環境科学特論 I / Special Lecture of Earth Surface Environment I	選択 / E	2	44	48		
	雪氷災害特論 / Topics in Snow and Ice Disasters	選択 / E	2	44	58		
	地盤変動特論 / Active Geological Processes	選択 / E	2	44	58		
	斜面災害特論 I / Disasters by Slope Movements	選択 / E	2	44,52,62	58		
	斜面災害特論 II / Hazards by Slope Movement II	選択 / E	2	44,52	58		
	火山土砂災害特論 / Advanced topics in volcano-hydrologic hazards	選択 / E	2	44	58		
	数値河川水理学特論 / Numerical Hydrodynamics	選択 / E	2	77	59		
	森林環境物理学 / Environmental Biophysics	選択 / E	2	62	58		
	農業水利調整学 / Advanced Agricultural Water Management	選択 / E	2	65	58		
	環境科学特定研究 / Project Research in Environmental Science and Technology	必修 / R	4	77	59		
37 38 39 40 (C) (D) (E)	環境科学演習 IV / Seminar in Environmental Science and Technology IV	必修 / R	1	99	59	1単位以上 / 1 or more	
	海外研究プロジェクト特別演習 / Project Research Exercise on Abroad	選択 / E	1	99	58		
	中間発表 / Presentation of Research Progress Report	選択 / E	1	99	59		
	ISI誌投稿特別演習 / ISI Journal Submission Exercise	選択 / E	1	99	58		
所属専攻科目 / Department course(s)		選択 / E	-	-	-		

修得単位：必修7単位，選択必修2単位以上修得のうえ，合計19単位以上修得のこと。
Credits Required: Total 19 credits or more including 7 credits in required courses and 2 credits or more in required elective courses

3. 必修授業科目履修の流れ (目安)

セメスター	(A)	(A) + (B)	(B) (C) (D) (E)
1	環境ファシリテーター論及び演習	所属コース専門科目 (1科目) 他コース専門科目 (1科目)	
2		所属コース専門科目 (1科目) 他コース専門科目 (1科目)	環境科学演習 IV
3		所属コース専門科目 (1科目)	
4			環境科学特定研究
5			
6			

4. グローバル農食養成プログラム及びグローバル防災・復興プログラム

プログラムの詳細は、●ページを参照してください。

(3) Important study-related notes

(1) Standard term of study and completion requirements

The standard term of study for Doctoral Programs at the Graduate School is three years. Completion requires students to be enrolled for at least three years, earn either at least 19 or 23 credits depending on the course standards stipulated in Appended Table 5 of the Niigata University Graduate School of Science and Technology Regulations and the educational program in the course concerned, submit a dissertation as an application for degree conferral after receiving the necessary research supervision, and finally pass dissertation review and final examination.

It is not possible for a student to remain enrolled for longer than six years.

(2) Research supervision

In regard to research supervision at graduate schools, Article 12 of the Standards for Establishment of Graduate Schools stipulates that “Graduate school education shall be provided via classes on course subjects and research supervision.”

Research-related supervision is not to be based on a credit system, and is required to be provided in a variety of formats. As it has a significant impact on graduate school education, research supervision has also become a course completion requirement at the Graduate School.

Research supervision provided at the Graduate School is provided broadly and effectively by a main supervisor and two sub-supervisors (collectively referred to as “supervisors”) assigned to each enrolled student.

As a general rule, students must decide on a research topic within one month of enrollment after consulting with their supervisors.

(3) Class subjects

a. Class subjects

Class subjects at the Graduate School are stipulated in the Niigata University Graduate School of Science and Technology Regulations and are classified as follows.

Lectures are class subjects taught by full-time faculty members, faculty members holding more than one post, and part-time lecturers.

Seminars and specified research are class subjects established under common themes within the course as well as under specified topics for each student. Contents and formats are stipulated within each department or course.

Each subject offered at the graduate school is represented by a two-digit code combination. It consists of 3, 4, or 5 as the tens digit, and 6, 7, 8, or 9 as the unit digit.

- 3 Subjects open to all graduate school students
- 4 Subjects only open to students in the Graduate School of Science and Technology
- 5 Subjects only open to students who belong to a specific department
- 6 Master’s Program basic level
- 7 Master’s Program core level
- 8 Doctoral Program basic level
- 9 Doctoral Program core level

b. Study requirements

Students must select class subjects in the course concerned as well as class subjects in other courses or departments after first consulting with the aforementioned supervising committee (main supervisor and two sub-supervisors), and must earn at least either 19 or 23 credits as stipulated in Appended Table 5 of the Niigata University Graduate School of Science and Technology Regulations and educational objectives of the course to which the student belongs.

c. Registration procedures

As a general rule, students must decide on class subjects and prepare a study plan within one month of enrollment after first consulting with their supervising committee.

In addition, at the beginning of each semester, students must determine which class subjects to take that semester and submit a registration notification using the designated format.

d. Recognition of credits

Recognition of credits for students deemed to have a sufficient number of hours of attendance in lectures and other activities shall be conducted via written or oral examinations and research reports.

e. Make-up examinations

Make-up examinations may be held for students unable to take a regularly-scheduled test due to illness or other unavoidable circumstances. The faculty member in charge of the class concerned will indicate date, times, locations, etc. for make-up examinations.

f. Grade assessments and standards

Class subjects are assessed on a 100-point scale with 60 points or higher passing and 59 points or lower failing. Passing students are awarded the designated credits.

Letter grades are assigned as follows: 80 points or higher = A; 70 to 79 points = B; 60 to 69 points = C; and 59 points or lower = D.

Grade assessment standards are as follows.

Points	Letter grade	Standard
80 to 100 points	A	The student has fully achieved the learning objectives of the class subject.
70 to 79 points	B	The student has achieved the learning objectives of the class subject to a certain degree.
60 to 69 points	C	The student has achieved the minimum learning objectives of the class subject.
0 to 59 points	D	The student has failed to achieve the minimum learning objectives of the class subject.

(4) Taking class subjects at other graduate schools

Students may take class subjects at other graduate schools if deemed educationally beneficial by their supervising committee.

Taking class subjects at another graduate school requires approval from the faculty council as well as discussion between this university and the graduate school concerned. Obtaining approval from other graduate schools requires a considerable period of time, so interested students must inform their main supervisor as early as possible.

Up to fifteen credits earned via class subjects taken at the other graduate school will be treated as having been earned at this Graduate School, and these may be certified as a portion of the credits required for course completion.

(5) When receiving research supervision at other graduate schools

Students may become a special visiting research student receiving research supervision at other graduate schools or research institutes if deemed educationally beneficial by their supervising committee.

Becoming a special visiting research student requires approval from the faculty council as well as discussion between Niigata University and the graduate school concerned. Obtaining approval from other graduate schools requires a considerable period of time, so interested students must inform their main supervisor as early as possible.

(4) Degrees

1) Degree conferral

Students completing a Doctoral Program at the Graduate School shall be awarded a doctoral degree.

2) Handling of dissertations

For information beyond the stipulations of the Niigata University Degree Regulations on how the Graduate School of Science and Technology handles dissertation submission qualifications, application procedures, dissertation review, etc., please carefully read the following “Procedures, etc. relating to degree conferral” and “Guidelines on writing dissertations as applications for degree conferral.”

○ Degree Conferral Procedures

Please note the following matters regarding procedures, etc. relating to degree conferral in Doctoral Programs.

1. Dissertation submission eligibility

Students deemed capable of meeting the Doctoral Program completion requirements shown in Items (1) or (2) below shall be considered eligible.

- (1) Students who have earned the credits stipulated in Article 9-3 of the Graduate School of Science and Technology Regulations while enrolled in the Graduate School and received the necessary research supervision
- (2) Students deemed to have outstanding research performance by the faculty council pursuant to the proviso in Article 32-2 of the Niigata University Graduate School Regulations, and have earned the credits stipulated in Article 9-3 of the Graduate School of Science and Technology Regulations and received the necessary research supervision

(For reference)

- Article 9-3 of the Graduate School of Science and Technology Regulations: “Regarding the class subjects stipulated in Paragraph 1, students in Doctoral Programs must earn either at least 19 or 23 credits depending on the standard credit requirements for the department concerned, as shown in Appended Table 5.”
- Article 32-2 of the Niigata University Graduate School Regulations: “In order to complete a three-year, doctoral (*hakase koki*) program or a doctoral program, students are required to be enrolled in the graduate school concerned for a minimum of three years, earn at least 12 credits in class subjects stipulated by the graduate school concerned, and pass doctoral dissertation review and the final examination after receiving the necessary research supervision.”

2. Dissertation submission

Students applying for dissertation review after being deemed eligible for dissertation submission by their supervising committee must submit the following designated documents to the Graduate School of Science and Technology Academic Affairs Division.

(1) Documents to submit

- | | |
|---|----------|
| 1) Dissertation Review Application (Form 1) | 1 copy |
| 2) Dissertation (on A4-size paper, in either Japanese or English) | 5 copies |
| 3) Dissertation Register (Form 2) | 5 copies |
| 4) Dissertation Abstract (approx. 2,000 Japanese characters in length) (Form 3) | 5 copies |
| 5) Dissertation Abstract (In English, no longer than one sheet of the | 5 copies |

- designated form) (Form 4)
- | | | |
|----|--|---------------|
| 6) | Reference papers (Academic papers that form the foundation of the dissertation) | 5 copies each |
| 7) | Letter of Consent (For co-authored reference papers) (Form 5, specified elsewhere) | 1 copy each |
| 8) | Curriculum Vitae (Form 6) | 5 copies |
| 9) | Letter of Approval from Research Supervising Committee (Form 7) | 1 copy |

- Dissertations must be unique papers written based on contents that have been published or are to be published in an academic journal with a peer review system.
- The term reference paper refers to papers that broadly served as a foundation when writing a dissertation and that either have been published or are scheduled to be published in an academic paper with a peer review system.

(2) Dissertation submission periods

- 1) For degree conferral in March: From February 1 to February 7
- 2) For degree conferral in September: From July 15 to July 21

3. Final examination

Final examinations are held orally during dissertation presentations with a focus on the contents of the dissertation under review.

4. Dissertation review

Dissertations are reviewed to determine worthiness as a doctoral dissertation, and approval of the field in which the degree is to be granted is also provided during the review process.

<p>Dissertation review standards at the Graduate School of Science and Technology of Niigata University</p> <p>Doctoral Programs</p> <ol style="list-style-type: none"> 1. Research contents: Whether or not the research contents are academically novel and original 2. Understanding of research trends: Whether or not the student has surveyed the prior research through searching the literature, participating in academic conferences, etc. and fully understands the background, significance, and importance of one's own research 3. Research plan and method: Whether or not the research plan and method are appropriate 4. Analysis of research findings: Whether or not the analysis of research findings is appropriate, and whether or not the student was able to obtain novel findings 5. Dissertation writing ability: Whether or not the format and contents of the paper are at the level of a doctoral dissertation 6. Dissertation presentation ability: Whether or not the student is able to present the research contents at graduate school presentations, academic conferences, etc. and able to appropriately answer questions 7. Publication of papers in academic journals: Whether or not the student has published or is scheduled to publish papers in an academic journal on the topic of the doctoral dissertation

5. Open dissertation presentation

Deadlines and venues for holding paper presentations are announced separately.

6. Degree conferral

Students who pass dissertation review and the final examination will receive a doctoral degree.

7. Publication of dissertation (See Article 19 of the Niigata University Degree Regulations)

The recipient of a doctoral degree must publish the paper within one year from the date of

degree conferral.

○ Guidelines on writing dissertations as applications for degree conferral

Students applying for doctoral dissertation review at the Graduate School must create documents in accordance with these guidelines.

Documents will not be accepted until they are in order, so students must have them inspected by a supervisor, etc.

In addition, the designated forms necessary in dissertation review procedures must be requested and obtained from the Graduate School of Science and Technology Academic Affairs Division.

1. Creating dissertation documents

(1) Dissertation Review Application [Form 1]

(2) Dissertation (on A4-size paper; in either Japanese or English)

Dissertations must be organized as follows.

- 1) Dissertations must display a title, the name of the department, and the name of the student.
- 2) As a general rule, dissertations must be submitted on white, high-quality paper.
- 3) The paper must be portrait-oriented, and text must be horizontal.
- 4) While it is preferable for dissertations to be printed in a long-lasting format, they may also be written on word processors or by hand, or copied.
When writing by hand, it is necessary to use black ink or a black ballpoint pen and write horizontally and carefully. When writing in English, it is necessary to use a typewriter or word processor.
- 5) All dissertations in English must be created using a typewriter or word processor.
- 6) It is not possible to correct or replace dissertations once submitted, so students must ensure that there are no typographical errors, omissions, etc.

(3) Dissertation Register [Form 2]

- 1) Dissertation registers must be created as shown in the example provided.
- 2) A title (including subtitle) must be displayed in the same manner as for dissertation submission.
- 3) Dissertations titled in a foreign language (English) must display the Japanese translation in parentheses under the title.
- 4) Unpublished papers (reference papers) must be accompanied by Proof of Acceptance for Publication from an academic society, etc.

(4) Dissertation Abstract [Form 3]

- 1) Abstracts must use Form 3 as the cover page.
- 2) The text must be approx. 2,000 Japanese characters in length and in accordance with the designated format.

(5) Dissertation Abstract (in English) [Form 4]

- 1) Abstracts must use Form 4 as the cover page. Covers must also be written in English.
- 2) Dissertation Abstracts must be written in English and no longer than one sheet of the designated form.
- 3) Dissertation Abstracts must be written using a word processor.

(6) Reference papers

- 1) The rules stipulated by each department must be followed.

- 2) All papers listed on the Dissertation Register must be submitted.
- (7) Letter of Consent [Form 5]
 - Letters of Consent must be submitted for co-authored reference papers.
- (8) Curriculum Vitae [Form 6]
 - 1) Curriculum Vitae must be created as shown in the example provided.
 - 2) The name of the student must be displayed exactly as it appears on his/her family register, and no nicknames, alias, pseudonyms, etc. may be used whatsoever. Names must also feature *furigana*.
 - 3) The student's legal domicile must display the name of the prefecture only. Foreign nationals must display the name of the country.
 - 4) The current address must display the address where the student is currently residing, including "in care of xxx" if applicable.
 - 5) Academic history must list university graduation, scheduled completion of graduate school, and other matters relating to educational background in chronological order. Students must also list all changes in status, including admission, leave of absence, re-admission, etc. Changes to school names during the period of enrollment and other such changes must also be listed.
 - 6) If the student was enrolled as a research student prior to enrolling at the Graduate School, then research history must list its details in chronological order. Students with no research history must write "None."
 - 7) Employment history must list the place of employment, occupational title, etc. for each full-time position held in chronological order. It is also preferable to list any part-time positions particularly related to education or research. Students with no employment history must write "None."
- (9) Letter of Approval from Research Supervising Committee [Form 7]
 - Seals of approval must be received from both the main supervisor and the chairperson of the department.
2. Other
 - (1) Regarding the aforementioned documents to submit, other than the document stipulated in Item 1-(1), one of the copies submitted must be the original document. The other four may be duplicates. However, when using photographs, etc. in the original copy of a dissertation, the same items used in the original must be used in the duplicates.
 - (2) If you have any questions about these creation guidelines, please contact the Graduate School of Science and Technology Academic Affairs Division.

論 文 目 録

/ 頁

報告番号	第 号	在籍番号	
専攻 コース		氏 名	
学位申請論文			
題名 の研究 又は Research of (..... の研究) ※和訳を付すこと			
参考論文は以下のとおり 編である。			
著者名および題名			
1. ○○○○他○名： の研究 令和 年 月発行 ○○○雑誌 第○巻第○号 ○○～○○頁に発表 (又は掲載決定)			
2. ○○○○他○名 : Research of (..... の研究) ※和訳を付すこと 令和 年 月発行 Journal of ○○○ Vol.○○,no.○○,pp○○～○○ に発表 (又は掲載決定)			
3. (以下上記と同じように記載する。)			
(注) 1. 参考論文の雑誌掲載の場合は、上記記載例のように記入する。 2. 論文題名が外国語の場合は、題目の下に日本語の訳文をカッコ書きで記入すること。 3. 参考論文は、著者名、論文名、雑誌等の発行年月日、雑誌名、巻、号、掲載頁の順に記入すること (上記例を参照のこと)。 著者が複数の場合は、当該雑誌等に記載された著者名の順に全員記入すること。 ただし、多数の場合には、主な共著者5名程度を記入し、その後に「他○名」と表示すること。 掲載頁は、初めと終わりの頁を記入すること。 なお、論文が未発表で掲載決定の場合は、頁を記入する必要はないが、学会等からの「掲載決定証明書の写し」を添付すること。			

履 歴 書

/ 頁

報告番号	第 号		
ふりがな	にいがた たろう		性別
氏名	新潟 太郎		
生年月日	昭和・平成 西暦(留学生) ○○年 ○○月 ○○日 生		
本籍 ※戸籍の所在地	○○ 都道府県 (留学生は国籍)	在籍番号	F○○A○○○A
現住所 電話番号	新潟県新潟市西区五十嵐二の町8050番地(下宿等は～方まで) () -		
最終学歴			
令和○年○月○日	○○大学○○学部○○学科卒業		
令和○年○月○日	○○大学大学院○○研究科		
	○○○○専攻修士課程(又は博士前期課程等)入学		
令和○年○月○日	○○大学大学院○○研究科		
	○○○○専攻修士課程(又は博士前期課程等)修了		
令和○年○月○日	新潟大学大学院自然科学研究科		
	○○○○専攻博士後期課程入学(又は進学)		
令和○年○月○日	新潟大学大学院自然科学研究科		
	○○○○専攻博士後期課程修了予定		
研究歴			
令和○年○月○日 ～令和○年○月○日	○○大学○○学部○○学科○○教授の下で, 研究生として ○○○○○についての研究に従事		
令和○年○月○日 ～令和○年○月○日	○○○株式会社○○研究所において, ○○○○○○に関する 研究に従事		
※研究歴がない場合は「なし」と記入願います。			
職歴			
令和○年○月○日	○○株式会社○○研究所研究員		
令和○年○月○日	同上退職		
※職歴がない場合は「なし」と記入願います。			

学位申請論文の表紙〔作成例〕

●日本語の場合

○ ○ ○ の 研 究 副 題 氏 名	○ ○ ○ ○ ○ の研究 — 副 題 — 氏 名 ○ ○ ○ ○ 新潟大学大学院自然科学研究科博士後期課程 ○ ○ ○ ○ 専攻
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●英語の場合

○ ○ ○ ○	Study on ○ ○ ○ ○ ○ — Subtitle — Name ○ ○ ○ ○ Doctoral Program in ○ ○ ○ ○ Graduate School of Science and Technology Niigata University
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(博士後期課程専攻名)

数理物質科学専攻

材料生産システム専攻

電気情報工学専攻

生命・食料科学専攻

環境科学専攻

Doctoral Program in Fundamental Sciences

Doctoral Program in Advanced Materials Science and Technology

Doctoral Program in Electrical and Information Engineering

Doctoral Program in Life and Food Sciences

Doctoral Program in Environmental Science and Technology

Degree Conferral Guidelines via Completion of Doctoral Program
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Purpose)

1. These guidelines stipulate necessary matters concerning conferral of doctoral degrees via completion of a Doctoral Program at the Graduate School of Science and Technology of Niigata University (hereinafter the “Graduate School”).

(Eligibility, etc. for dissertation submission)

2. Only students who have received the necessary research supervision and fall into either of the following categories are eligible to apply for dissertation review.

- (1) Students who have earned a designated number of credits by the end of the second program year (or, for students registered pursuant to Article 8 of the Niigata University Graduate School of Science and Technology Regulations (2004 GSSTR Ver. 1) (hereinafter “long-term students”), one year prior to the end of the semester in which the student wishes to receive a degree) and are expected to have been enrolled for the designated minimum term of study as of the end of the semester in which the student concerned wishes to receive a degree

- (2) Students deemed by the faculty council to have outstanding research achievements (excluding long-term students), and are expected to have been enrolled for the period stipulated in the proviso in Article 32-2 of the Niigata University Graduate School Regulations (2004 GSSTR Ver. 1)) and earn the designated number of credits as of the end of the semester in which the student concerned wishes to receive a degree

(Research supervising committee approval)

3. Students wishing to apply for dissertation review must perform the procedures stipulated in No. 4 after obtaining approval from their research supervising committee.

(Procedures, etc. for dissertation submission)

4. Students who have obtained the approval stipulated in No. 3 must submit the following documents (hereinafter “dissertation, etc. as application for degree”) to the dean. In addition, the dean may ask students to provide additional documents when necessary for review purposes.

- (1) Dissertation Review Application (Form 1 specified elsewhere) 1 copy
- (2) Dissertation (on A4-size paper; in either Japanese or English) 5 copies
- (3) Dissertation Register (Form 2 specified elsewhere) 5 copies
- (4) Dissertation Abstract (approx. 2,000 Japanese characters in length) 5 copies
(Form 3 specified elsewhere)
- (5) Dissertation Abstract 5 copies
(In English, no longer than one sheet of the designated form)

(Form 4 specified elsewhere)	5 copies each
(6) Reference papers (Academic papers that form the foundation of the dissertation)	
(7) Letter of Consent (For reference papers with co-authors) (Form 5 specified elsewhere)	1 copy each
(8) Curriculum Vitae (Form 6 specified elsewhere)	5 copies
(9) Letter of Approval from Research Supervising Committee (Form 7 specified elsewhere)	1 copy

4-2. Dissertations must be unique papers written based on contents that either have been published or could be published in an academic journal with a peer review system.

4-3. Reference papers shall be limited to papers that served as a foundation when writing a dissertation and that either have been published or are scheduled to be published in an academic journal with a peer review system (limited to those with Proof of Acceptance for Publication).

4-4. Dissertation submission periods are as follows.

(1) Students wishing degree conferral in March

From February 1 to February 7

(2) Students wishing degree conferral in September

From July 15 to July 21

(Acceptance of dissertations, etc.)

5. Once a dissertation has been accepted, the dean must entrust its review to the faculty council.

(Recommendations, etc. for review committee candidates)

6. The dean shall entrust chairpersons of departments with the following matters.

(1) Recommendations for review committee candidates

(2) Selection of name of field to be added to the doctoral degree

6-2. Upon being entrusted with review as stipulated in the preceding section, the chairperson of the department shall select the following individuals as review committee candidates for each dissertation via discussion with the departmental committee.

(1) Main supervisor

(2) One or more professors or associate professors in academic fields closely related to the dissertation

(3) One or more professors or associate professors in other academic fields

6-3. The review committee candidates stipulated in the preceding section must be the faculty members who are eligible to provide research supervision and lectures at the Graduate School.

6-4. When necessary for review purposes, the chairperson of the department may include among the review committee candidates other faculty members from the Graduate School, faculty members from other graduate schools or research institutions at Niigata University, or faculty members from

graduate schools or research institutions at other universities.

6-5. The chairperson of the department must promptly report the results of No. 6-1 to the dean using Form 8 specified elsewhere.

(Establishment of a review committee)

7. The faculty council shall establish a review committee for each dissertation, and shall select review committee members (one main reviewer and two or more sub-reviewers) from among the review committee candidates recommended by the chairperson of the department pursuant to No. 6-5.

(Dissertation review and final examination)

8. The review committee shall review the contents of the dissertation and hold the final examination, and must complete these by a date to be stipulated separately.

8-2. The main reviewer shall have the student present the contents of the dissertation at a public dissertation presentation, decide its date and venue via discussion with the chairperson of the department, and report these to the dean using Form 9 specified elsewhere.

8-3. The dean shall make an announcement of the dissertation presentation based on the report mentioned in the preceding section.

8-4. Once finished with the review, the review committee shall issue a report to the faculty council together with the Dissertation Abstract, Summary of Review Results (Form 10 specified elsewhere), and Summary of Final Examination Results (Form 11 specified elsewhere).

(Deliberation on course completion)

9. The faculty council shall deliberate on whether or not the student has satisfactorily completed the program based on the review committee's report.

Supplementary provision

These guidelines are effective as of April 1, 2004.

Supplementary provision

These guidelines are effective as of September 10, 2007.

Supplementary provisions

1. These guidelines are effective as of April 1, 2010.

2. Degree conferral for students who enrolled during or prior to AY2010 shall be governed in accordance with provisions then in effect.

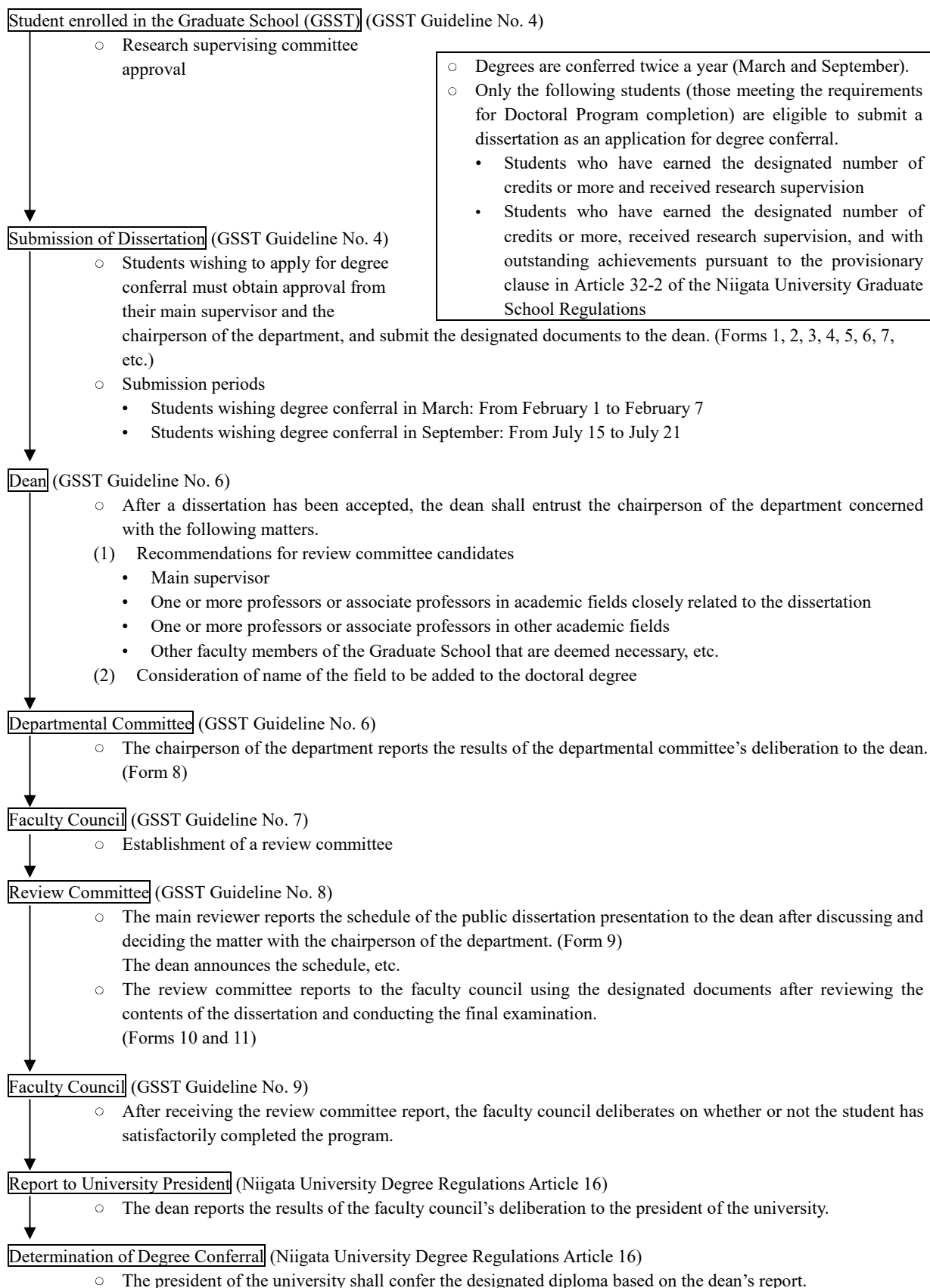
Supplementary provision

These guidelines are effective as of April 1, 2015.

Supplementary provision

These guidelines are effective as of April 1, 2016.

Degree Conferral Flowchart via Completion of Doctoral Program



Note 1: Detailed schedules shall be determined by the faculty council.

Note 2: **Research presentation** (Articles 1, 2 and 3 of the Terms of Agreement on Degree Conferral Guidelines)

- Research presentations shall be held publicly.
- Research supervising committees shall discuss and determine after presentations whether or not students possess the academic and research abilities necessary to write a dissertation and approve degree conferral.
- Implementation methods, etc. shall be stipulated by each department.

Terms of Agreements on Degree Conferral via Completion of Doctoral Program at the
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Partially revised on October 12, 2005)

(Partially revised on September 10, 2007)

(Partially revised on February 13, 2008)

(Partially revised on March 25, 2015)

Article 1. Research supervising committee approval for students wishing to undergo dissertation review pursuant to Article 3 of the Degree Conferral Guidelines via Completion of Doctoral Program at the Graduate School of Science and Technology of Niigata University (hereinafter the “Guidelines”) shall in principle be handled as follows.

- (1) The research supervising committee shall determine whether the student concerned possesses the academic capabilities and achievements necessary to write a dissertation as an application for degree conferral via a research presentation, and shall determine whether or not to approve submission of application based on the results.
- (2) The method by which the interim research presentation is held shall be determined by the department of the student concerned.

Article 2. The number of reference papers, as provided for in Guideline No. 4-3, shall be stipulated by the department to which the student concerned belongs.

Article 3. Regarding the stipulations of Guideline No. 4-4, departmental committees shall deliberate individually on cases of research conducted using national and public joint research institutions, etc. as well as on any other cases deemed necessary.

3-2. National and public joint research institutions, etc. as mentioned in the preceding paragraph shall refer to institutions that have been examined and approved by the departmental committee.

Article 4. Pursuant to Guideline No. 9 and Article 16 of the Niigata University Degree Regulations, in the event that the applicant is not deemed worthy of doctoral degree conferral, the applicant may request the university president to explain the reason.

4-2. In the event that the applicant is not deemed worthy of doctoral degree conferral, this shall not prevent the applicant from re-applying using a dissertation on the same research topic.

Guidelines on Special Provisions for Terms of Study in Doctoral Programs
Graduate School of Science and Technology of Niigata University

(April 1, 2004
Steering Committee)

(Partially revised on June 14, 2006)

(Partially revised on November 14, 2017)

Regarding special provisions for terms of study, as they pertain to completion requirements for Doctoral Programs at the Graduate School pursuant to Article 32-2 of the Niigata University Graduate School Regulations, the following guidelines shall be used when applying the designation of “students with outstanding research achievements.”

1. Application requirements (Students must meet all the conditions provided for in the following items (1) to (4). However, this shall not apply to students registered in accordance with Article 8 of the Niigata University Graduate School of Science and Technology Regulations.)
 - (1) Must have multiple papers published in prestigious academic journals (including papers scheduled for publication), and the contents must be of high academic value. However, the number of papers required of students admitted via special selective examinations for working adults and double degree program shall be stipulated by each department.
 - (2) Must be expected to be enrolled in the Doctoral Program at the Graduate School for the period stipulated in the proviso in Paragraph 2 of Article 32 of the Niigata University Graduate School Regulations, and must have earned (or be expected to earn) the designated credits
 - (3) Must be capable of submitting a dissertation by the designated deadline
 - (4) Must meet all conditions separately stipulated by the department concerned
2. Documents to submit

Students wishing to apply for these special provisions must submit the following documents to the dean via the chairperson of the research supervising committee.

 - (1) Letter of Recommendation (Form prescribed separately)
 - (2) Dissertation Draft Abstract
 - (3) Reference Papers (Either published or scheduled for publication)
 - (4) Dissertation Register
 - (5) Curriculum Vitae
 - (6) Proof of Acceptance for Publication (for papers scheduled for publication)
3. Method of determining application of special provisions

If the student's research committee chairperson deems the student to be with "outstanding research achievements" and recommends application of the special provisions for term of study, the decision on whether to apply the special provisions shall be made in consultation with the faculty council prior to applying for dissertation review.

In addition, when making said decision, a subcommittee on special provisions for terms of study (the details of which are to be stipulated separately in advance) shall review whether the research achievements, etc. of the student concerned meet the application requirements provided for in Section 1.

4. Review within the course concerned

If the student's research committee chairperson deems the student to have had "outstanding research achievements" based on the research presentation and wishes to recommend to the dean that the special provisions for term of study be applied, a review shall be conducted in advance within the course concerned to determine whether the student concerned meet the application requirements provided for in Section 1.

5. Subcommittee on special provisions for terms of study

(1) Regarding completion requirements for Doctoral Programs at the Graduate School, subcommittees on special provisions for terms of study (hereinafter "subcommittees on special provisions") shall be established under the jurisdiction of the faculty council in order to review whether to apply the special provisions for terms of study to students deemed to be "outstanding."

(2) Subcommittees on special provisions shall be composed of faculty council members belonging to the same department as the student applying for the special provisions.

However, it shall be possible to include one faculty council member from each of the other departments.

(3) Establishment of subcommittees on special provisions and selection of committee members shall be entrusted to the steering committee by the faculty council.

(4) Matters relating to the organization and administration of subcommittees on special provisions shall be stipulated separately.

Supplementary notes

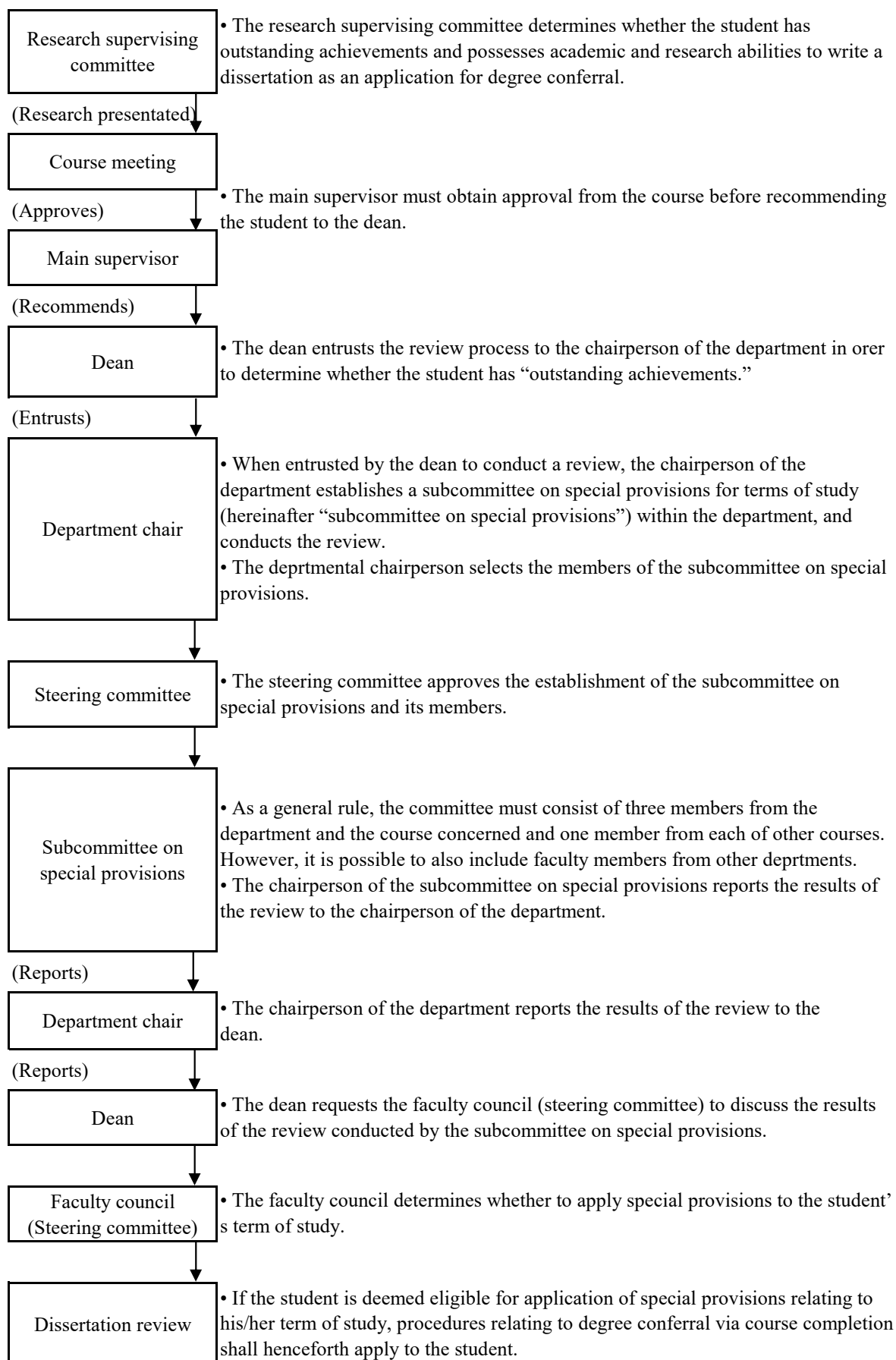
1. Conditions separately stipulated by departments, as provided for in Section 1-(4), shall be established by each department.

2. Although the Graduate School intends to implement the special provisions for terms of study in accordance with these guidelines for the time being, the contents are subject to revision at any time in order to better reflect actual conditions.

Supplementary provisions

These regulations are effective as of April 1, 2010.

Review Procedures Relating to Eligible Applicants of Special Provisions
 For Terms of Study in Doctoral Programs
 (“Outstanding students” pursuant to the proviso in Article 32-2
 of the Graduate School Regulations of Niigata University)



XII Student Life

学生生活

(1) Academic affairs (Reception)

Academic affairs (reception) for both master's and doctoral students are handled by the Academic Affairs Division of the Graduate School of Science and Technology (GSST) (hereinafter the "Academic Affairs Division") (located on the first floor of the GSST Administration Building).

Walk-in hours: Weekdays from 8:30 to 17:15

(2) Contact

As a rule, students are notified via postings.

Notifications and messages for students in the Graduate School are posted at the following location. Please check postings often and ensure that no information is overlooked or misread. Students failing to do so could be put at an unexpected disadvantage, so please be sure to check the bulletin board when arriving at and leaving campus.

- GSST Main Entrance Bulletin Board (first floor of the GSST Administration Building)

(3) Procedures

Procedures include those stipulated by regulations, etc., those notified via postings, and those conducted by students when necessary. Failing to perform or insufficiently performing these procedures, or failing to meet deadlines, not only puts students at a disadvantage, but could also interfere with their studies.

Please pay particular attention to the following matters.

1) Withdrawals and leaves of absence

Even if a student has no intention of returning to school, if the student does not apply for withdrawal or leave of absence, procedures to collect tuition fees* for the semester concerned will proceed automatically, which could have a serious impact on the student's enrollment status including expulsion, so please be sure to perform the application procedures in advance.

*** Procedures to collect tuition fees from enrolled students are conducted on April 1 for the first semester (April to September) and on October 1 for the second semester (October to March the following year).**

2) Withdrawal at completion of term

It is necessary to apply for withdrawal even when withdrawing at the completion of term (meaning withdrawal after being enrolled in a Doctoral Program for the designated term of study and earning the designated number of credits), so please be sure to perform the application procedure in advance.

If you have any questions, please contact the Academic Affairs Division (TEL: 025-262-7387).

(4) Use of GSST buildings

GSST buildings: GSST Administration Building, Science of Matter and Industrial Science University Institute Center, Information Science and Technology University Institute Center, Life Science and Environmental Science University Institute Center, and Environmental Science and Energy Science University Institute Center

1) Notifications

Usage of the bulletin board is permitted when there is room. Please apply at the Academic Affairs Division.

It is forbidden to post information in locations other than the bulletin board (such as on fire doors, walls, etc.).

- 2) Use of seminar rooms, etc.

Seminar rooms, etc. require reservations to use. Please apply in advance at the Academic Affairs Division.

When finished, please be sure to clean and tidy the room for the next user.
 - 3) Mail

When necessary to address mail to the Graduate School, please be specific, e.g., “ATTN: xxx Lab.”
 - 4) Energy conservation
 - Please turn off all unnecessary lighting and be sure not to forget to turn off the lights when leaving a room, etc.
 - Air-conditioning is set to 28°C during summer and 20°C during winter. Please be sure not to forget to turn off the air-conditioning when leaving a room, etc.
 - 5) Fire and theft prevention

When finished using a room, please take great care to extinguish all flames, lock the doors, and manage any valuables.
 - 6) Use of parking lots
 - Automobiles, motorbikes, etc. may not enter campus without a parking permit. Please be sure to have a parking permit issued if you wish to park on campus.
 - For automobiles, please use the parking lot next to the Information Science and Technology University Institute Center.
(Please do not use the parking lot in front of the GSST Administration Building main entrance as it is reserved for guests.)
 - For motorbikes and mopeds, please be sure to park in the designated motorbike parking area and walk the rest of the way from there.
 - Automobiles that do not display a parking permit as well as motorbikes, etc. parked anywhere other than the motorbike parking area will have a sticker applied as a warning.
- (5) Entering and exiting GSST buildings
- 1) As a rule, the main entrances and service entrances to GSST buildings are open as follows.
 - **Open hours: Weekdays from 7:45 to 19:00 (applicable to all GSST buildings)**
 - 2) At other times, including at night and on holidays, locks can be opened by swiping a Student ID Card through the card reader.
- (6) Garbage disposal rules
- Garbage separation follows different rules at universities (offices) than at general households. It is extremely dangerous to mismanage experimental waste, etc., so please use the utmost care.**
- 1) General garbage

Please separate and dispose of garbage as follows at the designated garbage collection site located next to the Information Science and Technology University Institute Center.

 - Burnable garbage
 - Plastic garbage (Plastic, vinyl, rubber, etc.)
 - PET bottles
 - Bottles
 - Cans
 - Unburnable garbage (Metal scraps, glass, ceramics, etc.)
 - 2) Waste paper

Recyclable waste paper may not be disposed of as burnable garbage. Please set out waste paper for collection as follows.

- Applicable types of waste paper: Newspapers, magazines, cardboard, OA (copy) paper, pamphlets, catalogs, and shredder waste
- Collection days: During the morning on the 2nd and 4th Friday of each month
- Collection sites:
 - In front of the administration office on the first floor of the GSST Administration Building
 - Next to the presentation space on the first floor of the Science of Matter and Industrial Science University Institute Center
 - In the entrance hall on the first floor of the Life Science and Environmental Science University Institute Center
 - The garbage collection site next to the Information Science and Technology University Institute Center

3) Miscellaneous recyclable waste paper

Types of recyclable waste paper other than those stipulated in Item 2) are recycled as “miscellaneous recyclable waste paper (*zatsugami*).”

◇ Applicable types of waste paper

- Tissue boxes, confectionery boxes and bags
- Office paper, memo paper, construction paper, paper folders
- Paper bags, paper boxes, packaging paper, envelopes, plastic wrap and toilet paper cores
- Paper towels (except highly soiled sheets), etc.
- * For details, please see the notification.
- * Collection days and sites are the same as indicated in Item 2) Waste paper.

4) Large garbage (including computers, etc.)

- Collection: Three time per year in July, November, and March
Time: Specified separately
- Collection sites
 - * North of the Science of Matter and Industrial Science University Institute Center
 - * South of GSST Administration Building
- Important matters
When disposing of computers, please erase all data or destroy the hard disk in order to prevent information leaks.
It is forbidden to dispose of items used personally such as automobile tires, televisions, refrigerators, computers, etc.

5) Experimental waste

- Please differentiate experimental waste from general garbage and dispose of it in accordance with the designated methods. For details, please visit the website of the Office for Environment and Safety homepage (<http://www.esc.niigata-u.ac.jp/>).
- Syringe needles used in experiments are classified as “infectious waste.” Due to the danger such needles present, please be sure to put them into a dedicated container and bring them to the Accounting Office in the General Affairs Section of the Graduate School of Science and Technology (on the second floor of the Graduate School of Science and Technology Administration Building).