Graduate Program Guide

Academic Year 2024

長岡技術科学大学

Nagaoka University of Technology

The English translation is solely for reference purpose and not a legally definitive translation of the original Japanese text. Shoud any differences arise between two versions, the Japanese version will prevail as an official authoritative version.

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Aim of Establishment and Philosophy

I. Aim of Establishment

The remarkable strides made in Japanese science and technology over the last few decades have been accompanied by no less outstanding achievements in Japanese industry. At the same time, the accelerating pace of innovation has raised new issues concerning the state of science and technology and its social role, and there is demand for training leading engineers equipped with practical and creative abilities who can contribute to the prosperity of humankind.

To meet such social demand, Nagaoka University of Technology (hereinafter referred to as "NUT") has been established under a new concept as an engineering university **with an emphasis on its graduate school** that conducts education and research directed at the development of practical technology.

II. Philosophy

NUT's most important mission is to create new knowledge and technologies, and to cultivate individuals with the ability to produce original ideas. To fulfill this mission, NUT will continue to be a "university of ideas", taking the fundamental philosophy of its education and research to be the cultivation of practical and creative abilities relating to *GIGAKU* (the "science of technologies"), heightening creative power. Under this approach with *GIGAKU*, NUT will serve as a world center of education and research and aims to become an indispensable university for both local and global communities, developing leading engineers equipped with the practical and creative abilities to undertake innovative creation and the ambition to help achieve a sustainable society.

About *GIGAKU* (the "Science of Technologies")

GIGAKU is "a form of science, concerned with technology, which refines and further develops technological systems by reinterpreting the diverse technical aspects of reality from a scientific perspective." Through "constant feedback between theory and practice, in which theories are drawn from practice and then tested again in practice," it aims to integrate the two. As such, it requires "understanding and application of a wide range of disciplines, from science and engineering to practical technology and management science."

Relationship between NUT's Philosophy and its Motto "VOS"

NUT's fundamental philosophy of education and research is symbolized by the acronym "**VOS**," which is its motto. Here, **V** stands for **Vitality,** which refers to the energy to carry out the never-ending feedback between theory and practice; **O** stands for **Originality**, which signifies the cultivation of creative abilities in *GIGAKU*; and **S** stands for **Services**, which means to contribute to the happiness and sustainable development of humanity by the use of *GIGAKU*.

Diploma Policy

[5-year Integrated Doctoral Program]

Nagaoka University of Technology's vision of human resource development involves the production of leading researchers and engineers who possess advanced practical and creative abilities that can facilitate the global expansion of technology and generate innovation, the ability to create new knowledge and technologies, as well as original and leading expertise. To this end, the 5-year integrated doctoral program has set the following four goals to enable students to acquire a broad education through the various major subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of in-depth scholastic knowledge that forms the foundation of each student's specialized field, as well as sufficiently advanced research abilities to independently conduct research. In particular, the program will facilitate the acquisition of the ability to explore new academic fields, highly advanced IT skills, progressive human qualities, and the practical capability to achieve social implementation.
2. Acquisition of the broad educational ability to view aspects of life, humanity, and society from the perspectives of technology and science; acquisition of the ability to pioneer new fields based on an understanding of integrated technologies covering multiple specialized disciplines; formation of multifaceted and flexible thinking abilities for advanced technology and science; and cultivation of an entrepreneurial spirit in new technological fields.
3. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. Formation of a cosmopolitan mode of thinking and communication ability balanced with advanced research and technical abilities, the ability to bring about technological and scientific innovation, as well as a global innovation leadership ability that can lead industries in Japan and the rest of the world.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through lectures, and have passed the doctoral thesis review based on the review standards stipulated by the department.

[Master's Program in Engineering]

In Nagaoka University of Technology's Master's Program in Engineering, the vision of human resource development is the production of leading engineers and researchers who are adept at using information technology, have acquired a safety mindset, and possess advanced practical and creative abilities that can facilitate the global expansion of technology. To this end, the master's program has set the following four attainment targets to enable students to acquire a broad education through the various major subjects, common subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced specialized knowledge and expertise in each student's specialized field, development of proficiency in information technology, and formation of a safety mindset.
2. Acquisition of the ability to comprehend life, humanity, and society from a technological perspective; gain an understanding of integrated technologies covering multiple specialized disciplines; and formation of multifaceted and flexible thinking abilities for advanced technology and science.
3. Acquisition of the ability to consider the impact of technology on the environment and safety, gain insight into global social and industrial trends, and development of the ability to demonstrate strategic technology management skills.
4. Acquisition of the ability to work collaboratively in a team with an international perspective, and development of the capability to compete fairly on the global stage as leading international engineers and researchers.

A master's degree will be conferred on students who have acquired the number of credits necessary for completion through lectures, seminars, and experiment/practical subjects offered to facilitate the acquisition of the above targets, and have also passed the master's thesis review.

[Doctoral Program in Engineering]

Nagaoka University of Technology's vision of human resource development involves the production of leading researchers and engineers who possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and leading expertise. To this end, the doctoral program has set the following four goals to enable students to acquire a broad education through the various major subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced research abilities needed to independently conduct research, as well as in-depth scholastic knowledge that forms the foundation of each student's specialized field.
2. Acquisition of the broad educational ability to view aspects of life, humanity, and society from the perspectives of technology and science; acquisition of the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; and the formation of multifaceted and flexible thinking abilities for advanced technology and science.
3. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through lectures, and have passed the doctoral thesis review based on the review standards stipulated by each department.

Curriculum Policy

[5-year Integrated Doctoral Program]

Nagaoka University of Technology aims to produce leading researchers and engineers who possess advanced practical and creative abilities that can facilitate the global expansion of technology and generate innovation, the ability to create new knowledge and technologies, as well as original and leading expertise. The 5-year integrated doctoral program comprises classes established by each department, and constitutes an educational program that allows students to acquire the following four types of abilities through classes, research guidance, and research activities for the doctoral thesis.

1. The ability to fully utilize cutting-edge specialized knowledge and skills in various technological and scientific fields. In particular, the program will focus on developing the ability to explore new academic fields, highly advanced IT skills, progressive human qualities, and the practical capability to achieve social implementation.
2. The broad educational ability to view aspects of life, humanity, and society from the perspectives of technology and science; the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; multifaceted and flexible thinking abilities for advanced technology and science; and an entrepreneurial spirit in new technological fields.
3. The ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. A cosmopolitan mode of thinking and communication ability balanced with advanced research and technical abilities, the ability to bring about technological and scientific innovation, as well as a global innovation leadership ability that can lead industries in Japan and the rest of the world.

Grading is conducted in a fair and impartial manner in accordance with the objective goals and criteria specified in the syllabus.

[Master's Program in Engineering]

Nagaoka University of Technology, in accordance with its Diploma Policy, offers subjects required in each specialized field of science and technology under the concept of an integrated undergraduate and master's program education. Through these subjects, the university will nurture the development of leading engineers and researchers who possess advanced practical and creative abilities that can facilitate the global expansion of technology. To this end, the master's program offers a systematic curriculum based on the following policies.

1. Specialized education is provided through the lecture subjects offered in each major. In addition, students will receive research guidance for the preparation of their master's thesis through seminars and experiment/practical subjects.
2. Through subject categories and subject groups offered by each major, the master's program provides an education that deepens expertise while also addressing interdisciplinary areas. In addition, students will be able to take subjects from other majors, thereby enabling them to understand integrated technologies that cover multiple specialized disciplines.
3. "Research Integrity" is a compulsory subject for all majors. In addition, students will take major subjects to develop proficiency in information technology and form a safety mindset that are closely related to each major.
4. Common subjects are offered to students in all majors to support the development of expertise from a broad perspective and increase their abilities to implement technology in society. Beginning from the undergraduate-level general studies subjects, these subjects are rationally and systematically organized with the aim of achieving each of the goals described in the Diploma Policy.
5. Graduate-level special courses and other courses are offered to facilitate more advanced and systematic study. While enrolled in their major, students can be awarded a certificate of course completion if they take and complete the stipulated subjects required for each course.
6. Students will be provided with opportunities to experience overseas practical research and development activities related to their master's research topics. By engaging in research and development in other countries, students can gain experience to become engineers and researchers who can perform at the global level.
7. The curriculum organizational diagram is provided to support students' self-directed and independent study.

[Policy for Academic Achievement Evaluation]

The syllabus of each subject will clearly state its purpose and attainment targets, as well as the learning/education goals based on the Diploma Policy. Grading is conducted in a fair, rigorous, and objective evaluation of performance, and credits will be awarded to those who pass the subjects. For the master's thesis, the screening criteria and methods are clearly stated, and pass/fail decisions are made through screening and examination by multiple faculty members.

[Doctoral Program in Engineering]

Nagaoka University of Technology aims to nurture the development of leading researchers and engineers who possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and leading expertise. The doctoral program comprises classes established by each department, and constitutes an educational program that allows students to acquire the following four types of abilities through classes, research guidance, and research activities for the doctoral thesis.

1. The ability to fully utilize cutting-edge specialized knowledge and skills in various technological and scientific fields.
2. The broad educational ability to view aspects of life, humanity, and society from the perspectives of technology and science; the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; as well as multifaceted and flexible thinking abilities for advanced technology and science.
3. The ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. A cosmopolitan mode of thinking and communication ability balanced with advanced research and technical abilities, as well as a global leadership ability that can lead industries in Japan and the rest of the world.

Grading is conducted in a fair and impartial manner in accordance with the objective goals and criteria specified in the syllabus.

Program Guide

Graduate School of Engineering

5-year Integrated Doctoral Program

Science of Technology Innovation

1. Overview

This Program Guide addresses the required curricula, subject requirements, and program completion criteria for students of Nagaoka University of Technology (hereafter referred to as “NUT”). The guide was prepared by the Academic Affairs Committee on January 17, 2024, and is based on Article 64 of the Rules of NUT.

The criteria described here are applicable to students enrolling in 2024.

If there are revisions to the curricula, subject requirements, and graduation criteria, Revisions to the Curriculum Table and other necessary documents will be distributed to enrolled students at the guidance sessions for each academic year conducted at the start of April.

NUT was established as a New Concept University for engineering, with an emphasis on a graduate school that conducts education and research centered on the development of practical technologies.

As such, the mission of NUT is to create new knowledge and technologies, as well as to cultivate human resources with a high level of expertise and creativity. The principle that underlies education and research at NUT is the development of creative abilities associated with *Gigaku* — the science of technologies.

The personnel to be trained in the 5-year integrated doctoral program and the associated education objectives are outlined in the guide to the Department of Science of Technology Innovation.

2. Subjects, Credits and Period of Classes

The subjects and credits offered in the 5-year integrated doctoral program are detailed in the Department of Science of Technology Innovation subject list.

The standard amount of time required to earn 1 academic credit involves content for 45 hours of studying, and is calculated using the following criteria:

① Lectures: 15 hours of classes and 30 hours of preparation/review = 1 credit.

② Exercises (Seminars; Reading and Discussion/Seminar): 30 hours of classes and 15 hours of preparation/review = 1 credit

③ Experiments and Practical Training: 45 hours of classes = 1 credit

To ensure the quality and international applicability of the education provided at NUT, there will be 15 classes conducted for each subject, with classes conducted on holidays if required.

For details on each subject, please refer to the online version of the Syllabus. (URL: https://www.nagaokaut.ac.jp/kyoiku/jyugyou/jyugyou_kamoku/jyugyou_kamoku.html)

The period of classes is set by the academic year. The academic year is divided into three terms; 1st term, 2nd term and 3rd term.

[Terms]

1st term: April 1 to August 31, 2nd term: September 1 to December 31, 3rd term: January 1 to March 31

Class Timetable will be posted at the beginning of the academic year and uploaded on our official website. Students are required to develop a study plan based on the Class Timetable.
(URL：https://www.nagaokaut.ac.jp/kyoiku/jyugyou/timetable.html)

3. Subject Registration

(1) The subjects will, in principle, be conducted strictly according to the curriculum for the program.

(2) Students must register for all subjects that they intend to take during the subject registration period at the start of the first term and second term in which each subject (including intensive lecture subjects) begins.

(3) At the start of each academic year, the Division of Academic Affairs will post Class Timetable on the university's official website.

(4) At the start of each school term, the Division of Academic Affairs will distribute a *Guide to Subject Registration* and *Subject Registration Forms*.

(5) Students must carefully refer to this Program Guide and the Class Timetable, develop a study plan with guidance from their academic supervisors, and register online for subjects based on the posted guides during the subject registration period for each term.

(6) For subjects scheduled for the third year or higher, students must submit the *Subject Registration Form* to the lecturer-in-charge of the intended subject during the subject registration period in order to obtain approval for attending classes.

(7) Students must check the results of their subject registration application online during the subject registration period. After checking the subject registration results, students may (under guidance from their academic supervisors) make modifications, additions, or cancellations to the registered subjects if necessary. These changes must be recorded online during the registration revision period after subject registration.

(8) If a student must cancel registration for a subject due to an unavoidable reason after the registration revision period, the student must submit a *Subject Cancellation Form* to the Division of Academic Affairs.

(9) Although some intensive lecture subjects may have undecided class schedules during the subject registration period, students are still required to register for these subjects (as described in item [2] above) if they wish to take them. In these cases, a registration cancellation period will be provided, and students must follow the cancellation procedure if they no longer wish to take a subject. Students should take note of the registration cancellation procedure and period for intensive lecture subjects, which will be posted on notice boards, etc.

(10) Students are not allowed to take intensive lecture subjects with schedules that completely or partially overlap with other subjects. In such cases, students must cancel their registration for one of the overlapping subjects during the registration cancellation period. If students are found to

have taken two subjects with overlapping schedules without cancelling their registration for one, they may be given a failing grade for both subjects.

(11) Please note that if a student has not cancelled registration for a subject and fails to attend classes or sit for an examination, the student will receive an automatic failure for that subject.

4. Examinations and Performance Evaluation

(1) In principle, examinations will be conducted at the end of the school term to conclude the subject. However, examinations may also be conducted at other times at the discretion of the lecturer-in-charge, with these interim examinations taking the place of the final examination. In addition, some subjects may utilize daily evaluations or reports in place of the final examination.

(2) Students are evaluated using the following grades: S, A, B, C, and D, which are detailed below.

Grade	Meaning	Points	GP
S	Student has thoroughly fulfilled the academic objectives of the subject and has achieved outstanding results	90–100	4
A	Student has thoroughly fulfilled the academic objectives of the subject	80–89	3
B	Student has fulfilled the academic objectives of the subject	70–79	2
C	Student has fulfilled the minimal academic objectives of the subject	60–69	1
D	Student has not fulfilled the academic objectives of the subject	0–59	0

GP (Grade Point) refers to the points obtained for each grade.

S, A, B, and C are considered passing grades.

(3) Students who pass the final examination of a subject will receive the prescribed credits for that subject. Credits that have already been acquired cannot be cancelled or modified by repeating the subject.

(4) The Grade Point Average (GPA) system has been implemented to provide an indicator that allows the comprehensive evaluation of academic achievement, as well as to conform to international grading evaluation schemes.

(5) The GPA is calculated using a credit-weighted average of the GP from all subjects taken by a student, regardless of pass/fail status. However, subjects that are unrelated to program completion are excluded from calculation. In cases where a student has prematurely dropped a subject or failed to sit for an examination, the student will receive a GP score of “zero” for that subject, but its credits shall still be included in the denominator for GPA calculation. GPAs are calculated to 2 decimal places.

(6) Students are to check their subject results online during the following periods: Middle of August for the first term, beginning of February of the subsequent year for the second term, and beginning

of March for the third term. Students are to check the bulletin board for details along with the notice indicated in (7).

(7) Students may ask the lecturer in charge of each class directly for confirmation when they have any concerns regarding evaluations/grades. The University has a grade appeal system for students who could not resolve their concern by asking the lecturer. Check the bulletin board for details, as students will need to fulfil conditions for application of grade appeal.

5. Subject Requirements and Program Completion

The subject requirements and program completion criteria are described in the guide to the Science of Technology Innovation.

6. Application for Thesis Screening and Degree Conferral

Applications for thesis screening and degree conferral are to be conducted based on NUT's School Regulations and the Rules for the Administration of Degree Thesis Screening in Nagaoka University of Technology.

7. Other Points to Note

For undergraduate-level subjects (limited to subjects where credits have yet to be acquired), the credits acquired will be recognized but will not count toward the credits required for completion of the 5-year integrated doctoral program.

Science of Technology Innovation

1. Fostering Human Resources

This program offers a 5-year integrated doctoral program that combines the conventional master's program and doctoral program. In this program, students may acquire a doctoral degree in as little as 3 years without having to undergo master's thesis screening, as well as participate in long-term overseas study programs and earn an MBA.

With a foundation in advanced research capabilities and an education that incorporates different disciplines and cultures, we aim to cultivate outstanding leaders (global innovation leaders) that are globally competitive, have the power to innovate, and the ability to drive Japanese and global industries. The following exemplify the types of personnel that we aim to foster in this program.

◇ Startup Company/Business-Oriented Personnel ◇

Here, we cultivate engineers with the ability to adopt a managerial perspective by integrating front-line research experience in specialist fields with an MBA earned from the University of Japan, which is a collaborative partner of Nagaoka University of Technology.

◇ Project Manager-Oriented Personnel ◇

By providing experience in multidisciplinary research projects, we train project managers who are able to implement a cross-disciplinary approach.

2. Education Objectives

With a focus on the target personnel described above, this program aims to facilitate the acquisition of the following abilities in students to cultivate global innovation leaders who can play an active role at the international level.

1. A strong interest in the courses and research conducted at Science of Technology Innovation, the ability to innovate at the global level, and fulfill a leading role in the advancement and development of the world's industries
2. Advanced research capabilities in various fields (such as mechanical engineering, electrical engineering, materials science, civil engineering, and bioengineering), a multifaceted perspective, as well as practical and interdisciplinary integrated capabilities in science and technology
3. English language ability, communication capability, facilitation capability, research proposal development capability, and the fundamental capabilities for business development that can aid in research, project promotion, and information transmission
4. Ability to recognize the core essence of a research topic through scientific methods, and to deduce truly innovative solutions
5. Farsighted perspective, business-mindedness, strong ethical values, and the ability to practically utilize these abilities

3. Subject Organization

The first to fifth years of the 5-year integrated doctoral program are referred to as GD1 to GD5.

The specialized education subjects, credits, course periods, and lecturers-in-charge are described in the attached table. In the table, a designation of "1・2 (①～②)" for a subject indicates that the subject can be taken in either GD1 or GD2, in the 1st to 2nd terms.

3.1 Compulsory Subjects

"Science of Technology Innovation Seminar I and II" and "Advanced Experiment of Science of Technology I and II" correspond to subjects offered at the master's level, while "Science of Technology Innovation I and II" correspond to subjects offered at the doctoral level. In principle, these subjects will be conducted under each student's academic supervisor in their assigned research laboratory. However, there may be cases where the seminars are jointly conducted by two or more laboratories.

The "International Research Internship" provides students with the opportunity to experience research activities overseas (or a similar environment) for a minimum of 4 weeks at the universities, companies or research institutions overseas.

The "Research Ethics I" and "Research Ethics II" provides students with the opportunity to understand the research ethics, social responsibility and roles necessary to conduct research.

3.2 Elective-Compulsory Subjects and Science of Technology Innovation Subjects (Elective)

These subjects are specially offered by our program to cultivate global innovation leaders. In addition to Japanese academic staff with active international roles, our faculty includes world-class foreign staff and accomplished staff with industrial backgrounds and extensive experience as project leaders.

An example of these subjects is "Practical Work on Product Development", where students from different fields form research and development teams with companies to conduct project-based research and development. In "Practical Work for Project Leader Education", students will gain practical experience in research planning conducted with local SMEs (small and medium-sized enterprises). In principle, this subject will be conducted in English, and students will gain innovative abilities, English language abilities, communication abilities, facilitation skills, research plan proposal abilities, and business development abilities.

3.3 Specialized Engineering Subjects (Elective)

Students enrolled in this program are free to take subjects according to their personal specialties and interests from among the wide variety of classes offered at NUT's Graduate School of Engineering. Through these subjects, students will cultivate advanced research abilities in fields such as mechanical engineering, electrical engineering, materials science, civil engineering, and bioengineering. In addition, they will also acquire practical multi-interdisciplinary integrated abilities in the science of technology.

Furthermore, students enrolled in this program can take elective subjects offered by the master's and doctoral programs of other majors, and have these credits recognized as major subject credits for this program. However, this only applies to subjects that can be taken in English. Specifically, these refer to master's program subjects that are marked with the following symbols in each major's

attached table in the Program Guide: ◎, ●, ☆, ★, and A. Note that subjects with the ◎ and ● symbols can only be taken in the years that they are offered in English. For doctoral program subjects, all elective subjects from any majors are eligible for credit recognition in this program. In principle, students should take the master's-level subjects during the 2-year period from GD1 to GD2 and the doctoral-level subjects during the 3-year period from GD3 to GD5.

Students are encouraged to seek guidance from their academic supervisor when selecting their elective subjects.

3.4 Common Subjects (Elective)

Based on NUT's principles regarding common subjects, in principle, students must acquire a minimum of 6 credits from common subjects during the 2-year period from GD1 to GD2.

3.5 Regarding the Acquisition of an MBA

The Master of Business Administration (MBA) is a degree awarded to individuals who have acquired the skills and abilities to implement a scientific approach in business administration. Our program has established an agreement with the International University of Japan (Minami-Uonuma City, Niigata Prefecture), and we plan to jointly offer a course that allows our students to also acquire an MBA from that university.

4. Completion Requirements

4.1 Requirements for Program Completion

In order to complete this program, students must earn a total of 42 credits or more (18 credits from compulsory subjects, a minimum of 6 credits from the elective-compulsory subjects outlined in the attached figure, a minimum of 12 credits from the elective subjects, and a minimum of 6 credits from the common subjects), and pass the doctoral thesis screening and final examination. However, in cases where permission has been granted by the student's academic supervisor, a portion or all of the 12 credits for the elective subjects may be replaced by credits earned from major subjects in the master's or doctoral programs of other majors (See Section 3.3). In these cases, students must fill in the *Registration Form for Taking Subjects in Other majors* after receiving approval from their academic supervisors, and submit the completed form to the Division of Academic Affairs.

The doctoral thesis will be based on the consolidated results of research conducted under the guidance of the academic supervisor. Students are encouraged to present their doctoral research content at scientific meetings and journals in their field of study while they are enrolled at NUT.

Students intending to complete the program quickly should aim to acquire a minimum of 37 or 38 credits (a minimum of 13 or 14 credits from the compulsory subjects, a minimum of 6 credits from the elective-compulsory subjects, a minimum of 12 credits from the elective subjects, and a minimum of 6 credits from the common subjects) during the 2-year period from GD1 to GD2.

Table. Credits for Program Completion

Compulsory Subjects	18 (13–14)
Elective-Compulsory Subjects	6 (6)
Elective Subjects	12 (12)
Common Subjects	6 (6)
Total	42 (37–38)

* Numbers in parentheses refer to the estimated credits that should be taken in the 2-year period from GD1 to GD2 for early completion.

4.2 Requirements for Early Completion

Students may complete the doctoral program within a minimum of 3 years if they fulfill all the program completion requirements (including all research achievements such as scientific papers related to the doctoral thesis research) as determined by a program faculty meeting.

5. Third-Year Transfer Students

Students who pass the **third-year entrance examination and selection for working adults** may transfer into the third year of the 5-year integrated doctoral program in NUT's Graduate School of Engineering. These students shall be considered to have obtained the following credits during GD1 to GD2: 6 credits from compulsory subjects (Science of Technology Innovation Seminar I, Science of Technology Innovation Seminar II, Advanced Experiment of Science of Technology I, and Advanced Experiment of Science of Technology II), 14 credits from elective subjects, and 6 credits from common study subjects. In addition, third-year transfer students who enroll in the WISE Program's "WISE Global Pro-Active Root Technology Program" should refer to "Section 6. WISE Program" below. (WISE Program: Doctoral Program for World-leading Innovative & Smart Education)

6. WISE Program

Students enrolled in the WISE Program's "WISE Global Pro-Active Root Technology Program" shall acquire credits in accordance with the terms established by the WISE Global Pro-Active Root Technology Program, WISE Program, Ministry of Education, Culture, Sports, Science and Technology.

	Model A Entrepreneurial-type Individuals	Model B Innovative Leader-type Individuals	Example of a Different Type of Enrollee
Undergraduate	Prize winner in a business competition as an undergraduate	Work experience in a Southeast Asian company through an overseas Jitsumu-Kunren internship	Obtained 8 advanced credits for graduate school-level courses (Reduced burden for earning credits in graduate school)
GD1	[Production Factor and Industrial Management Engineering] [English Business Communication]	[English Business Communication] [Design for GIGAKU Innovation] [Tacit Knowledge Based Innovation]	[Facilitation Engineering on Science and Technology] International Conference Presentation
GD2	Practical work experience at an overseas startup company during [International Research Internship] [Leadership Development] 	[Regional Industries in Foreign Countries]  Collaborative research and scientific paper authorship with a European corporation or advanced research laboratory during [International Research Internship]	Collaborative research with a European university during [International Research Internship] [Innovation Case Study] [Global Research Strategy] 
GD3	[Advanced Entrepreneurship] Patent Application	[Global Research Strategy]  Practical work experience in research planning at a regional SME during [Practical Work for Project Leader Education]	Supervising technical college students during [Practical Work on Research Guidance]  Patent Application
GD4	Startup company established during [Product Development Project Training] Earn MBA credits from the International University of Japan Awarded Doctorate	Awarded Doctorate  Employment as a researcher and research planner in an overseas corporation after skipping 2 grades	Practical work experience as a researcher planner at an SME during [Practical Work for Project Leader Education] 
GD5	MBA from the International University of Japan 		Studying at an overseas university as part of a double degree program
After graduation	CTO of a globally expanding startup company		Employment as top-level academic staff at a university or technical college with a global perspective and expertise in science of technology innovation

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory/Elective		Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Compulsory		Science of Technology Innovation Seminar I	1	1･2①	Staff	☆
		Science of Technology Innovation Seminar II	1	1･2②～③	Staff	☆
		Advanced Experiment of Science of Technology I	2	1･2①	Staff	☆
		Advanced Experiment of Science of Technology II	2	1･2②～③	Staff	☆
		International Research Internship	4	1～5①～③	Staff	☆
		Science of Technology Innovation I	3	2～5①	Staff	☆
		Science of Technology Innovation II	3	2～5①	Staff	☆
		Researcher Ethics I	1	1･2②	Nakayama, Tanaka(S), Sasaki(Toru) & Maki	☆
		Researcher Ethics II	1	1～5①～⑤	Staff	☆
		Total	18			
Elective Compulsory		Advanced Science of Technology Innovation Engineering	2	1･2①～②	Nakayama, ※Ninomiya & ※Hanada	☆
		Practical Work on Venture Flotation Training 1	2	1･2①～③	Katagawa, Yamaguchi, Suzuki (N) & ※(　)	☆ (GD3~5 may register)
		Practical Work on Venture Flotation Training 2	1	1~5①～③	Katagawa, Yamaguchi, Suzuki (N)	☆
		Practical Work for Project Leader Education	3	1･2①～③	Staff	☆
		Practical Work on Product Development	2	1～5①	Staff	☆
		English Business Communication	1	1～5①	Yamaguchi, Maki & (　)	E　☆
		Facilitation Engineering on Science of Technology	2	1～5②	Yamaguchi, Maki, ※Ichitsubo & Others	O　☆
		Plan Drafting Method for Science of Technology	1	1～5①～③	Staff	☆
		Innovation Case Study	2	1～5①～③	Staff	☆
		Practical Work on Research Guidance	2	1～5①～③	Staff	☆
		Practice of Idea Development	3	1～5①～③	Kaida,Yamazaki & Adlin	☆
		Total	21			
Elective	Science of Technology Innovation	Design for GIGAKU Innovation	2	1～5①～③	Kaida	O　☆
		Industrial Planning and Management	2	1～5①	Maki	E　☆
		Global Research Strategy	2	1～5①	Yukawa, Yamaguchi & ※ Tamune	E　☆
		Advanced Industrial Structure	2	1～5①	Yamaguchi & ※(　)	E　☆
		Tacit Knowledge Based Innovation	2	1～5②	Nakayama	E　☆
		Leadership Development	2	1～5①～②	Kaida	E Classes can also be conducted in English if international students are enrolled.
		Production Factor and Industrial Management Engineering	2	1～5②	Yamaguchi & ※ Nakamura (H)	O　☆
		Regional Industries in Foreign Countries	2	1～5②	Yamada (N) , Yamaguchi & Others	E　☆
		Advanced Entrepreneurship	2	1～5①～③	Yamaguchi & ※(　)	O　☆
		Business Communication	2	1～5②	Sasaki (Toru), ※Cristian & ※ Ohishi	☆
		Creative Leadership	2	1～5②	Sasaki (Toru), ※Ohishi & ※ Tajiri	☆

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory/Elective		Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Elective	Science of Technology Innovation	Cultural Intelligence (CQ)	2	1～5①	Sasaki (Toru), ※Ohishi &※ Damaschin	☆ Not conducted in 2024
		Cultural Leadership	2	1～5②	Sasaki (Toru), ※Ohishi &※ Damaschin	☆ Not conducted in 2024
		Design Thinking	2	1～5①	Sasaki (Toru), ※Cristian & ※ Ohishi	☆
		Digital Communications	2	1～5②	Sasaki (Toru), ※Ohishi &※ James	☆
		Robotic Process Automation (RPA)	2	1～5①	Sasaki (Toru), ※Ohishi &※ James	☆
		Social Innovation	2	1～5②	Sasaki (Toru), ※Ohishi &※( )	☆ Not conducted in 2024
		Technology Management	2	1～5①	Sasaki (Toru), ※Ohishi &※ Sugiyama	☆
		Think Like A Futurist	2	1～5①	Sasaki (Toru), ※Ohishi &※ Artis	☆
		Total	38			
	Common Subjects	Modern Mathematics	2	1･2②	Hara	
		Theory of Mathematical Analysis	2	1･2①	Yamamoto (Ke)	
		Sports Bio-mechanics	2	1･2①	Okushima	
		Social Welfare	2	1･2②	※ Yoneyama	
		Introduction of Cognitive Science	2	1･2①	※Kitajima	
		Language and Thought	2	1･2②	Kano & Shigeta	
		Advanced Psychology	2	1･2①	※Yamakawa	
		Advanced Safety Engineering	2	1･2②	Kadowaki	
		Science and technology in modern society	2	1･2①	※ Kurihara	
		Advanced Safety and Information Security I	1	1･2②	Miyoshi ※Ogino & Itoh(Kosuke)	
		Advanced Safety and Information Security II	1	1･2②	Miyoshi & ※Sakurai(Tsu)	
		Energy and Economy in Japan	2	1･2①	Li & ※ Itoh (Kokichi)	
		Advanced Business Management	2	1･2①	※ Ikushima	
		Japanese Industrial Development and SDGs	2	1･2②	Katsumi	☆ A
		Gigaku Innovation and Creativity	2	1･2①	Manada	☆
		An outline of Intellectual Property	2	1･2①	※ Yoshii	
		Practice of Idea Development	2	1･2①･②	Kaida,Yamazaki & Adlin	Same content both 1st term & 2nd term
		Technological English	2	1･2②	Ikrashi	★
		English for Science and Technology	2	1･2①	Takahashi(M)	★
		English for Academic Purposes	2	1･2①	※Takahashi (A)	★
		Fundamental English for Graduate Students	2	1･2②	Fujii	★
		English Presentation Skills	2	1･2①	Nobuhara	★
		Analytical Reasoning and Presentation	2	1･2①	※ Moulinos	☆

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory/Elective		Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Elective	Common Subjects	Professional Discourse and Presentation	2	1･2②	※ Moulinos	☆
		Language and Understanding of Other Cultures	2	1･2①	Kano	
		Characters in Modern Japanese Literature	2	1･2①	Wakabayashi	
		International Relations	2	1･2①	※Kuroda	
		Compliance of Corporation	2	1･2①	※ Suenaga	
		Introduction to the SDG Practice	2	1･2①	Nanko, ( ) & ※Katsumi（M）	★
		Social Skills Considering from Diversity	2	1･2①	Yamamoto (M), Nanko, ※ Nishihara & ※Koguchi	

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided
2) In the "Year/Term" column, the numbers indicate the designated years and terms, respectively, for each subject (Terms are encircled)

【Symbols in the Notes Column】
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Can be conducted in English for SDG Professional Course students
I: Subject is offered only to international students

Program Guide

Graduate School of Engineering

Master's Program in Engineering

1. Overview

This Program Guide addresses the required curricula, subject requirements, and program completion criteria for students of Nagaoka University of Technology (hereafter referred to as “NUT”). The guide was prepared by the Academic Affairs Committee on January 17, 2024, and is based on Article 64 of the Rules of NUT.

The criteria described here are applicable to students enrolling in 2024.

If there are revisions to the curricula, subject requirements, and graduation criteria, Revisions to the Curriculum Table and other necessary documents will be distributed to enrolled students at the guidance sessions for each academic year conducted at the start of April.

NUT was established as a New Concept University for engineering, with an emphasis on a graduate school that conducts education and research centered on the development of practical technologies. As such, the mission of NUT is to create new knowledge and technologies, as well as to cultivate human resources with a high level of expertise and creativity. The principle that underlies education and research at NUT is the development of creative abilities associated with *Gigaku* — the science of technologies.

NUT’s master’s program aims to develop practical and creative abilities in students, and to train highly qualified leading engineers to fulfill society’s needs.

The curricula are designed according to the objectives of each individual major, and are effectively organized to provide a seamless and consistent education between the undergraduate and graduate levels. The education methods are described below.

(1) Major Subjects

These subjects systematically facilitate the understanding of fundamental engineering knowledge and support the acquisition of advanced specialized and interdisciplinary knowledge.

(2) Common Subjects

These subjects foster the management abilities needed to maximize the value of technology in enterprises and industrial activities, as well as the capabilities to comprehend various technological matters from social and international perspectives. In addition, these subjects provide a foundation of diverse and advanced intellectual qualities to increase practical technological skills and support enhanced specialization from a wide scope.

(3) Research Work (Fundamental Research and Development Research)

Preparation of the master’s thesis will require students to conduct fundamental research together with production application research with the central aim of gaining advanced and comprehensive technical expertise.

2. Subjects, Credits and Period of Classes

The subjects and credits offered by each major in the master’s program are detailed in the provided curricula tables (Attached Tables).

The standard amount of time required to earn 1 academic credit involves content for 45 hours of studying. This is calculated using the following criteria while taking into account the differences in education effectiveness and the required studying time outside of lectures, which are dependent on class methods.

① Lectures: 15 hours of classes and 30 hours of preparation/review = 1 credit.

② Exercises (Seminars): 30 hours of classes and 15 hours of preparation/review = 1 credit

③ Experiments and Practical Training: 45 hours of classes = 1 credit

To ensure the quality and international applicability of the education provided at NUT, there will be 15 classes conducted for each subject, with classes conducted on holidays if required.

For details on each subject, please refer to the online version of the Syllabus (URL: https://www.nagaokaut.ac.jp/kyoiku/jyugyou/jyugyou_kamoku/jyugyou_kamoku.html)

The period of classes is set by academic year. The academic year is divided into three terms; 1st term, 2nd term and 3rd term.

[Terms]

1st term: April 1 to August 31, 2nd term: September 1 to December 31, 3rd term: January 1 to March 31

Class Timetable will be posted at the beginning of the academic year and uploaded on our official website. Students are required to develop a study plan based on the Class Timetable.

(URL：https://www.nagaokaut.ac.jp/kyoiku/jyugyou/timetable.html)

3. Subject Registration

(1) The subjects will, in principle, be conducted strictly according to the curriculum for each academic year and major.

(2) Students must register for all subjects that they intend to take during the subject registration period at the start of the first term and second term in which each subject (including intensive lecture subjects) begins.

(3) At the start of each academic year, the Division of Academic Affairs will post Class Timetable on the university's official website.

(4) At the start of each school term, the Division of Academic Affairs will post a *Guide to Subject Registration*.

(5) Students must carefully refer to this Program Guide and the Class Timetable, develop a study plan with guidance from their academic supervisors, and register online for subjects based on the posted guides during the subject registration period for each term.

(6) Students must check the results of their subject registration application online during the subject registration period. After checking the subject registration results, students may (under guidance from their academic supervisors) make modifications, additions, or cancellations to the registered subjects if necessary. These changes must be recorded online during the registration revision period after subject registration.

(7) If a student must cancel registration for a subject due to an unavoidable reason after the registration revision period, the student must submit a *Subject Cancellation Form* to the Division of Academic Affairs.

(8) Although some intensive lecture subjects may have undecided class schedules during the subject registration period, students are still required to register for these subjects (as described in item [2] above) if they wish to take them. In these cases, a registration cancellation period will be provided, and students must follow the cancellation procedure if they no longer wish to take a subject. Students should take note of the registration cancellation procedure and period for intensive lecture subjects, which will be posted on notice boards, etc.

(9) Students are not allowed to take intensive lecture subjects with schedules that completely or partially

overlap with other subjects. In such cases, students must cancel their registration for one of the overlapping subjects during the registration cancellation period. If students are found to have taken two subjects with overlapping schedules without cancelling their registration for one, they may be given a failing grade for both subjects.

(10) Please note that if a student has not cancelled registration for a subject and fails to attend classes or sit for an examination, the student will receive an automatic failure for that subject.

4. Examinations and Performance Evaluation

(1) In principle, final examinations will be conducted at the end of the school term to conclude the subject. However, examinations may also be conducted at other times at the discretion of the lecturer-in-charge, with these interim examinations taking the place of the final examination. In addition, some subjects may utilize daily evaluations or reports in place of the final examination.

(2) Students are evaluated using the following grades: S, A, B, C, and D, which are detailed below.

Grade	Meaning	Points	GP
S	Student has thoroughly fulfilled the academic objectives of the subject and has achieved outstanding results	90–100	4
A	Student has thoroughly fulfilled the academic objectives of the subject	80–89	3
B	Student has fulfilled the academic objectives of the subject	70–79	2
C	Student has fulfilled the minimal academic objectives of the subject	60–69	1
D	Student has not fulfilled the academic objectives of the subject	0–59	0

*GP (Grade Point) refers to the points obtained for each grade.

S, A, B, and C are considered passing grades.

(3) Students who pass the final examination of a subject will receive the prescribed credits for that subject. Credits that have already been acquired cannot be cancelled or modified by repeating the subject.

(4) The Grade Point Average (GPA) system has been implemented to provide an indicator that allows the comprehensive evaluation of academic achievement, as well as to conform to international grading evaluation schemes.

(5) The GPA is calculated using a credit-weighted average of the GP from all subjects taken by a student, regardless of pass/fail status. However, subjects that are unrelated to program completion are excluded from calculation. In cases where a student has prematurely dropped a subject or failed to sit for an examination, the student will receive a GP score of “zero” for that subject, but its credits shall still be included in the denominator for GPA calculation. GPAs are calculated to 2 decimal places.

(6) Students are to check their subject results online during the following periods: Middle of August for the first term, beginning of February of the subsequent year for the second term, and beginning of March for the third term. Students are to check the bulletin board for details along with the notice indicated in (7).

(7) Students may ask the lecturer in charge of each class directly for confirmation when they have any

concerns regarding evaluations/grades. The University has a grade appeal system for students who could not resolve their concern by asking the lecturer. Check the bulletin board for details, as students will need to fulfil conditions for application of grade appeal.

5. Subject Requirements

(1) Students must earn 30 credits or more to complete the master's program. Of these, a minimum of 24 credits shall be from the graduate-level subject offered in the relevant academic major. However, in special cases where permission has been granted by the academic supervisor, a portion of these 24 credits may be replaced by credits earned from graduate-level subjects in other majors. In these cases, students must consult with their academic supervisor and register graduate-level subject offered in other majors. Then the students must obtain approval from their academic supervisor. However, if the reason for taking subjects offered in other majors is just for interest and etc., registration of this subject is not approved. Subjects offered in System Safety Engineering are offered only for students in its major and students in other majors can not take these subjects.

(2) From among the 30 credits required for completing the master's program, 6 credits must be earned from Common Subjects.

(3) Subjects related to the Practical Study Project for master's students are available. Students can be awarded credits for seminars and experiment subjects by taking replacements for compulsory subjects available in the various majors.

6. Program Completion

(1) In order to complete the master's program, students must have been enrolled at the Graduate School of Engineering for a minimum of 2 years, earned the prescribed credits, undertaken the necessary research work, submitted their master's thesis, and passed the necessary thesis screening and final examination. However, with regard to the period of enrollment, students with particularly outstanding academic performance may be allowed to complete the program after being enrolled for only 1 year or more.

(2) The master's thesis must be submitted before the prescribed deadline during the student's enrollment period.

7. Application for Thesis Screening and Degree Conferral

Applications for thesis screening and degree conferral are to be conducted based on NUT's Degree Rules and the Regulations of Handling of Thesis/Dissertation Screening.

8. Miscellaneous Points

(1) For graduate-level subjects that are designated for a specific school year or term, students should, in principle, take those subjects during the designated school year or term. However, in special cases where students need to take a subject in a non-designated year or term, they must first obtain approval from their academic supervisor, and obtain permission from the President of NUT after submitting an *Application to Take Subject in Non-Designated Year* or *Application to Take Subject in Non-Designated Term*.

(2) For undergraduate-level subjects (limited to subjects where credits have yet to be acquired), the credits

acquired will be recognized but will not count toward the credits required for completion of the master's program.

9. Credit Transfers

NUT has established credit transfer agreements with 7 universities/national institute of technology within Niigata prefecture and several other universities outside of the prefecture. These agreements allow students to take subjects and earn credits from the graduate schools of other universities.

10. Regarding the Administration of Undergraduates Taking Graduate-Level Subjects

Agreement for the Administration of Undergraduates Taking Graduate-Level Subjects

October 21, 2005
Approved by the Academic Affairs Committee

Undergraduate students at Nagaoka University of Technology (hereinafter referred to as "NUT") who wish to take graduate-level subjects offered in the first term of the master's program are subject to the following conditions:

(1) Undergraduate students may apply for these subjects if they are in their fourth year, and meet or exceed the eligibility criteria for each program; applicants will be generally limited to approximately 10% of the student body. Approval must be obtained from the respective Chair.

(2) The credits for the subjects taken will be limited to a total of 8 credits, with a maximum of 6 credits for Major Subjects and a maximum of 2 credits for Common Subjects. Students must obtain approval from the lecturer-in-charge of each subject. Applications to take these subjects may be rejected if the students have not taken the necessary preliminary subjects or if there are too many students in the class.

(3) Even if a student passes the final examinations of these subjects, the credits will not be recognized as undergraduate-level credits. However, if the student continues to graduate school at NUT and reports completion of the subject, the results will be accepted as graduate-level credits. Students who have taken the subjects as undergraduates and wish to re-take the subjects as graduate students must obtain permission from the lecturer-in-charge of the subjects prior to subject registration.

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Flow of the Subject-Taking and Grade-Processing Procedures

① Each Chair will issue an *Application for Undergraduate Students to Take Graduate-Level Subjects* to applying students that fulfill Agreement (1) as described above.

② As per Agreement (2), undergraduate students who wish to take graduate-level subjects must first obtain a permission seal (*kyoka-in*) from the lecturer-in-charge of the relevant subject, and then obtain approval from the Chair of the student's program of study before submitting the application to the Section of Student Affairs, Division of Academic Affairs. The Division of Academic Affairs will keep the original application and provide copies to the applying student, associated lecturers-in-charge, and the Chair.

③ The Division of Academic Affairs will distribute forms for the *Report on the Examination Results of Undergraduate Students Taking Graduate-Level Subjects* (which includes the student's name, etc.) to the associated lecturers-in-charge at the end of July.

④ The lecturers-in-charge will report the subject examination results of students described in ② at the end of the school term to the Division of Academic Affairs using the *Report on the Examination Results of Undergraduate Students Taking Graduate-Level Subject* forms (described in ③).

⑤ The Division of Academic Affairs will keep the *Report on the Examination Results of Undergraduate Students Taking Graduate-Level Subjects* received from the lecturers-in-charge, and distribute copies to the respective students and the leader of the student's program of study.

⑥ As per Agreement (3), after the student enters graduate school at NUT, students can submit the copy of the report described in ⑤ together with the *Report on the Results of Undergraduate Students Taking Graduate-Level Subjects* to the Division of Academic Affairs, and obtain acknowledgment of their results.

⑦ Based on the reports described in ⑥, the Division of Academic Affairs will process the results as results obtained in the student's first term of the first year in the master's program. Even if the reported subjects are not conducted in the student's first year in the master's program or the subjects have been discontinued, the results will still be recognized as grades from that subject in the first year.

⑧ As per the procedures conducted in ⑦, the results of these subjects will be included in the results notification for the student's first term of the master's program.

11. Acquisition of Teacher's License Certification

For information on acquisition of Teacher's License Certification, please refer to the Japanese version of the program guide.

Guide to Major Programs

(Master's Program in Engineering)

Mechanical Engineering

[Diploma Policy]

Mechanical Engineering has set the following four attainment targets for students in accordance with the Diploma Policy of the Master’s Program in Engineering.

1. Acquisition of the advanced specialized knowledge and expertise in mechanical engineering, development of proficiency in information technology such as data science, and formation of a safety mindset.
2. Acquisition of the ability to comprehend life, humanity, and society from a technological perspective; gain an understanding of integrated technologies covering multiple specialized disciplines including information technology, artificial intelligence, and data science; and formation of multifaceted and flexible thinking abilities for advanced technology and science.
3. Possess a strong awareness of SDG attainment, gain insight into global social and industrial trends, and development of the ability to demonstrate strategic technology management skills.
4. Acquisition of the ability to work collaboratively in a team with an international perspective, and development of the capability to compete fairly on the global stage as leading international engineers and researchers.

[Curriculum Policy]

Mechanical Engineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. Acquisition of the advanced specialized knowledge and expertise in mechanical engineering, development of proficiency in information technology such as data science, and formation of a safety mindset.	To provide students with the advanced specialized knowledge needed to understand/analyze various phenomena and discover new phenomena in mechanical engineering, the major offers information-related subjects and safety-related subjects in addition to the major subject groups of the Mechatronics Engineering course, Smart Factory course, and Environment and Energy course. Students may also take subjects from other majors, thereby enabling them to understand integrated technologies that cover multiple specialized disciplines.
2. Acquisition of the ability to comprehend life, humanity, and society from a technological perspective; gain an understanding of integrated technologies covering multiple specialized disciplines including information technology, artificial intelligence, and data science; and formation of multifaceted and flexible thinking abilities for advanced technology and science.	The major offers diverse and advanced groups of common subjects to cultivate the ability to comprehend life, humanity, and society from a technological perspective. Seminars are held throughout the first and second years of the master's program to foster the students' abilities to ascertain technological trends and gather information in English. Through special practicals and master's research, students will gain an understanding of integrated technologies covering multiple specialized disciplines, and cultivate multifaceted and flexible thinking abilities for advanced technology and science.
3. Possess a strong awareness of SDG attainment, gain insight into global social and industrial trends, and development of the ability to demonstrate strategic technology management skills.	The major offers diverse and advanced groups of major subjects and common subjects to foster the students' abilities to ascertain and gain insight into the latest trends in society and industry, demonstrate strategic technology management skills, and link these with the attainment of SDGs. In the process of conducting special practicals and master's research, as well as by compiling their results into the master's thesis, students will expand their discussions with their academic supervisors and other researchers while cultivating strategic technology management skills.

4. Acquisition of the ability to work collaboratively in a team with an international perspective, and development of the capability to compete fairly on the global stage as leading international engineers and researchers.	The major offers diverse and advanced groups of major subjects and common subjects to foster an international perspective. Research Integrity is offered as a compulsory subject with the aim of cultivating the capability to compete fairly on the global stage. In addition, an overseas practical research and development course is offered to enable students to acquire the ability to work collaboratively in a team with an international perspective.

1. Education Objectives

The objective of this major is to develop leading engineers with advanced practical and creative abilities who can respond to the challenges of the machine industry and its related fields by utilizing the integrated education between the undergraduate and master's programs at NUT. This is accomplished by building a foundation of practical technical insight based on the expertise and fundamental scholastic abilities acquired from undergraduate studies and the Jitsumu-Kunren Internship experience. Major Subjects in this major are divided into the following 3 courses: Mechatronics Engineering and Smart Factory, as well as Environment and Energy Engineering. Students will follow a sequential curriculum with the following education objectives:

(1) In-depth specialized expertise as mechanical engineers
(2) Ability to ascertain technological trends and information from a wide scope
(3) Practical ability to develop unique technologies to respond to advances in society
(4) Advanced research and development capabilities with international applications
(5) A sense of engineering ethics that takes into account people's safety, welfare, and health
(6) Ability to independently and continuously learn
(7) Internationally competent communication ability

2. Education Goals

In order to achieve the education objectives outlined in Section 1, the Mechanical Engineering major has established the following education goals:

(A) Specialized Abilities (Major Subjects in the Attached Table)

(A1) Expertise in Mechanical Engineering: Building on the expertise acquired at the undergraduate level, students will gain even more advanced expertise and scholastic ability by taking subjects that address information and control engineering, design and production engineering, heat and fluid engineering, material science and engineering, interdisciplinary mechanical engineering.

(B) Human Qualities (Humanities/Social Science Subjects, Mechanical Engineering Seminars, Research Integrity)

(B1) Internationally Wide Social Perspective: Ability and training as leading engineers to provide insight on global social and industrial trends, and consider people's safety and welfare

(B2) Engineering Ethics/Social Responsibility: Ability to understand the influence and effects of technology on society and the environment, as well as an awareness of one's responsibilities as leading engineers

(B3) Leadership and Critical Abilities: Flexible attitude that allows the objective evaluation of one's own abilities as a leading engineer

(C) Practical Abilities (Major Subjects, Mechanical Engineering Special Practicals)

(C1) Goal-setting Abilities: Ability to understand society's technological demands and to set worthwhile goals as engineers

(C2) Planning Proposal Abilities: Ability to independently identify research tasks, and to use acquired knowledge and skills to design and implement experimental/research plans

(C3) Continuous Self-Improvement: Attitude of continuous self-improvement and autonomous learning to adapt to society's changes

(D) Conversational Skills (Humanities/Social Science Subjects, Mechanical Engineering Seminars, and Mechanical Engineering Special Practicals)

(D1) Communication/Presentation Skills: Communication/presentation skills to explain simply and discuss one's own areas of expertise or research results

(D2) International Communication Abilities: Fundamental ability to express oneself and to exchange opinions in an international setting using the English language

(E) Research and Development Capabilities (Mechanical Engineering Seminars and Mechanical Engineering Special Practicals)

(E1) Problem Identification Ability: Ability to identify unknown phenomena or unsolved problems from knowledge acquired through various methods

(E2) Problem Investigation Ability: Ability to conduct a multifaceted investigation of a problem and determine solutions

3. Subject Organization

3.1 Subject Requirements

The subjects are composed of experimental/practical training subjects (compulsory), lecture subjects (compulsory) and lecture subjects (elective).

Experimental/practical training subjects, i.e., "Mechanical Engineering Special Practicals 1 and 2" and "Mechanical Engineering Seminars 1 to 4" are all compulsory subjects and will be conducted under each student's academic supervisor in their assigned research laboratory. For "Mechanical Engineering Special Practicals 1 and 2", each student will conduct research following experimental/research plans formulated through discussions with their academic supervisor. "Mechanical Engineering Seminars 1 to 4" are reading and discussion (journal club) sessions. In principle, these seminars will be conducted in the research laboratory of each student's academic supervisor throughout the 2 years of the master's program. There may be cases where the seminars are jointly conducted by two or more laboratories with similar specialties. "Research Integrity" is essential for understanding the concept of fairness in conducting research as a graduate student.

All lecture subjects (elective)are conducted based on each lecturer's field of study with a high degree of specialization. In addition to selecting the lecture subjects, the table below shows the associated field of study for each subject. The relationships between these subjects and corresponding undergraduate-level subjects are also shown to facilitate deeper understanding of the lectures. To avoid cases where students develop a limited scope and focus only on the subjects in their field, it is important for the students to independently and systematically select the subjects to take while considering their future personal applicability. Students are encouraged to select lecture subjects after careful discussions with their academic supervisors.

3.2. Subjects in English

Among the subjects offered in the Mechanical Engineering major, there are some subjects offered in English. These subjects are mainly targeted at students from the SDG Professional Course. Non-SDG Professional Course students are also encouraged to take actively a series of subjects in English.

* The SDG Professional Course fulfills the following conditions:

1) It is possible to earn a degree within the prescribed duration for graduate school.
2) It is possible to earn the requisite 30 credits (lecture subjects and experimental/practical training subjects) for completing the master's program through subjects conducted in English.

3) All supervision required for the master's program research can be conducted in English.

4. Research Work and Master's Thesis

The standard schedule for subject-taking and completion procedures for students who complete the program in March is as follows:

(1) Research Laboratory Assignment

<NUT Graduates> After conclusion of the Jitsumu-Kunren Internship or the topic briefing session following the Thesis Research Project presentation (March (before enrollment))

<Non-NUT Graduates>

- Students who graduated from technical college advanced courses: after the informal decision for acceptance into the master's program (July (before enrollment))
- After the informal decision for acceptance into the master's program and consultation with the Chair or the intended academic supervisor (February to March (before enrollment))

(2) Schedule (For Students Completing in March)

Master's Program, First Year;

April: Deciding the student's academic supervisor

April: Deciding the research topic

Interim presentation and assessment of the master's thesis will be conducted during November (M1) to May (M2).

Master's Program, Second Year;

End of November to Start of December: Submission of Academic Degree Application Form

Start of December: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

January: Designation of the screening committee

End of January to March: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

March: Degree conferral ceremony

(3) Schedule (For Students Enrolling in September and Completing in August)

Master's Program, First Year;

September: Deciding the student's academic supervisor

September: Deciding the research topic

Interim presentation and assessment of the master's thesis will be conducted during August (M1) to October (M2).

Master's Program, Second Year;

Start of April to Middle of May: Submission of Academic Degree Application Form

Late May: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)
Recommendation of screening committee candidates (Chair → NUT President)

June: Designation of the screening committee

Middle of June to Start of July: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)
Master's thesis presentation
Master's thesis screening and final examination
Presentation of the examination results and decision review on degree conferral
Degree conferral council

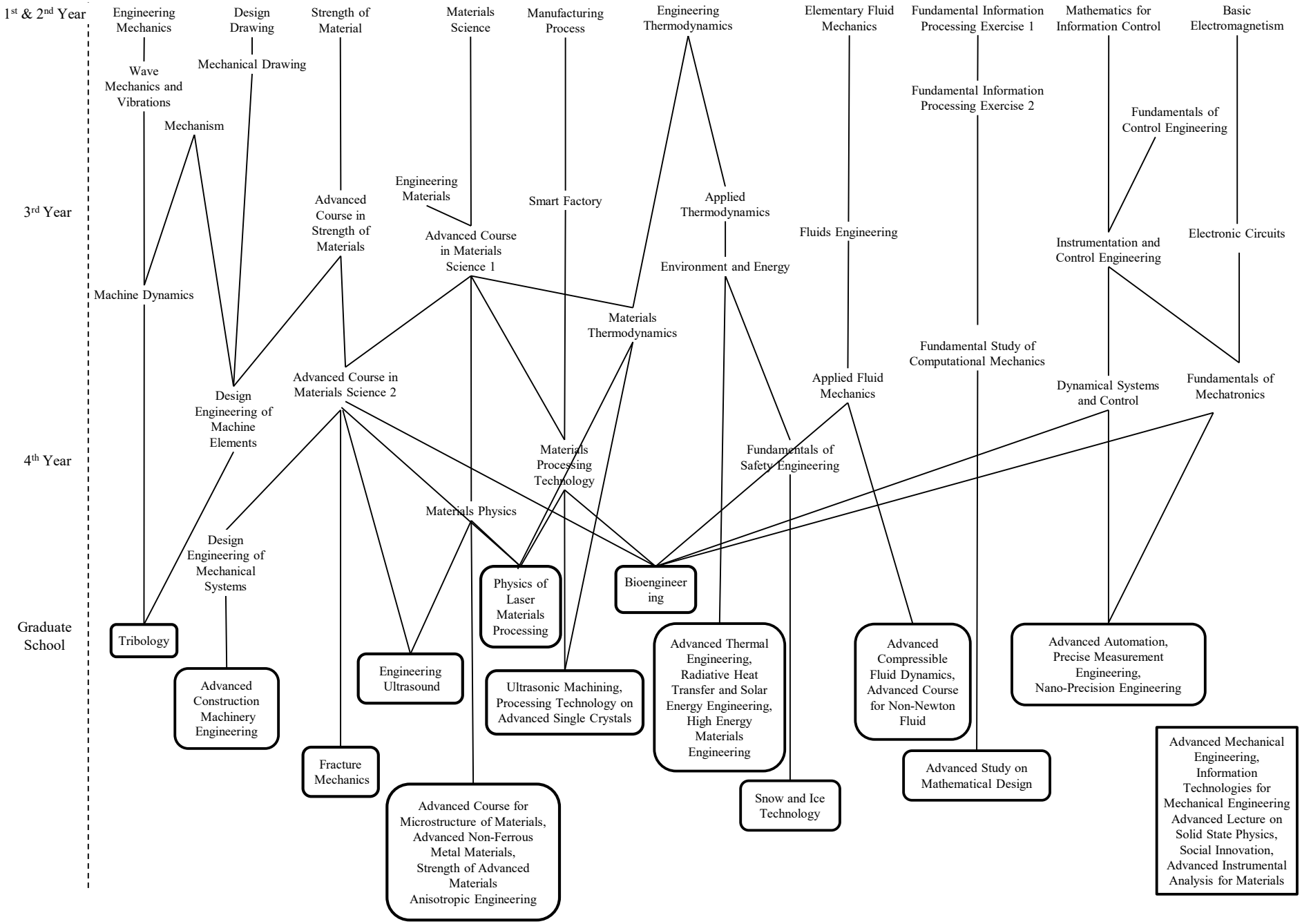
August: Degree conferral ceremony

(4) Presentations at Scientific Conferences

Students are encouraged to present their master's research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

	Mechatronics Engineering Course	Smart Factory Course	Environment and Energy Course
Bachelor's Program in Engineering (Elective-Compulsory・General Elective)	〔Common/General Subjects〕 Exercises in Mathematics and Dynamics, Exercises in Computer Programming, Applied Statistics, Linear Algebra, Electronic Circuits, Fundamentals of Mechatronics, Materials Thermodynamics, Integrated Exercises for Mechanical Engineering 4, Special Lectures on Mechanical Engineering, Fundamentals of Safety Engineering, Engineering Materials, Materials Physics, Materials Processing Technology		
	(Elective-Compulsory) Advanced Course in Strength of Materials, Machine Dynamics, Design Engineering of Machine Elements, Fundamental Study of Computational Mechanics, Instrumentation and Control Engineering, Dynamical Systems and Control	(Elective-Compulsory) Advanced course in Materials 1, Advanced course in Materials 2, Engineering Materials, Design Engineering of Mechanical Systems, Machine Dynamics, Design Engineering of Machine Elements, Smart factory	(Elective-Compulsory) Advanced course in Materials 1, Applied Thermodynamics, Applied Fluid Mechanics, Fluid Engineering, Environment and Energy

Master's Program in Engineering	〔Common Subjects〕 Advanced Mechanical Engineering, Information Technologies for Mechanical Engineering, Social Innovation, Advanced Lecture on Solid State Physics、Advanced Instrumental Analysis for Materials, Advanced Course for Microstructure of Materials, Advanced non-ferrous metal materials, Strength of Advanced Materials, Anisotropic Engineering, Research Integrity		
	Advanced Automation, Advanced Study on Mathematical Design, Precise measurement engineering, Bioengineering	Tribology, Advanced Construction Machinery Engineering, Fracture Mechanics, Engineering Ultrasound, Ultrasonic machining, Processing Technology on Advanced Single Crystals Physics of Laser Materials Processing	Advanced Thermal Engineering Advanced Compressible Fluid Dynamics, Advanced Course for Non-Newton Fluid, Radiative Heat Transfer and Solar Energy Engineering, High Energy Materials Engineering, Snow and Ice Technology


1st & 2nd Year
3rd Year
4th Year
Graduate School
Engineering Mechanics
Design Drawing
Strength of Material
Materials Science
Manufacturing Process
Engineering Thermodynamics
Elementary Fluid Mechanics
Fundamental Information Processing Exercise 1
Mathematics for Information Control
Basic Electromagnetism
Wave Mechanics and Vibrations
Mechanical Drawing
Fundamental Information Processing Exercise 2
Mechanism
Fundamentals of Control Engineering
Engineering Materials
Advanced Course in Strength of Materials
Smart Factory
Applied Thermodynamics
Fluids Engineering
Instrumentation and Control Engineering
Electronic Circuits
Advanced Course in Materials Science 1
Environment and Energy
Machine Dynamics
Materials Thermodynamics
Fundamental Study of Computational Mechanics
Advanced Course in Materials Science 2
Applied Fluid Mechanics
Dynamical Systems and Control
Fundamentals of Mechatronics
Design Engineering of Machine Elements
Materials Processing Technology
Fundamentals of Safety Engineering
Materials Physics
Design Engineering of Mechanical Systems
Physics of Laser Materials Processing
Bioengineering
Tribology
Advanced Construction Machinery Engineering
Engineering Ultrasound
Ultrasonic Machining, Processing Technology on Advanced Single Crystals
Advanced Thermal Engineering, Radiative Heat Transfer and Solar Energy Engineering, High Energy Materials Engineering
Advanced Compressible Fluid Dynamics, Advanced Course for Non-Newton Fluid
Advanced Automation, Precise Measurement Engineering, Nano-Precision Engineering
Fracture Mechanics
Advanced Course for Microstructure of Materials, Advanced Non-Ferrous Metal Materials, Strength of Advanced Materials Anisotropic Engineering
Snow and Ice Technology
Advanced Study on Mathematical Design
Advanced Mechanical Engineering, Information Technologies for Mechanical Engineering Advanced Lecture on Solid State Physics, Social Innovation, Advanced Instrumental Analysis for Materials

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	1st Year to 2nd Year Term 2	1st Year to 2nd Year Term 3	Lecturer-in-Charge	Notes
Compulsory	Mechanical Engineering Seminars 1	1	●			Staff	① A
	Mechanical Engineering Seminars 2	1		●		Staff	① A
	Mechanical Engineering Seminars 3	1	●			Staff	② A
	Mechanical Engineering Seminars 4	1		●		Staff	② A
	Mechanical Engineering Special Practicals 1	2	●			Staff	① A K
	Mechanical Engineering Special Practicals 2	2		●		Staff	① A K
	Research Integrity	1	●*	●*		<1st Term> Chair, ※ Ito(Y) <2nd Term> Chair, ※ Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
	Total	9					
Elective	Advanced Mechanical Engineering	2	●			Chair	
	Information Technologies for Mechanical Engineering	2	●			Wei	I
	Advanced Automation	2		●		Kobayashi (Y)	☆ A K
	Processing Technology on Advanced Single Crystals	2		●		Aida	① K
	Tribology	2		●		Ohta & Taura	K
	Advanced Construction Machinery Engineering	2		●		Abe (M)	O K ★
	Ultrasonic machining	2	●			Isobe (H)	A K
	Advanced Precision Metrology	2	●			Aketagawa	● K
	Engineering Ultrasound	2		●		Ihara	A ● K
	Snow and Ice Technology	2	●*	●*		Kamimura (S) & Sugihara	A ★ K S *Classes are held in English in the first term and Japanese in the second term.
	Advanced Thermal Engineering	2	●			Suzuki (M)	K
	Advanced Compressible Fluid Dynamics	2		●		Yamazaki (W)	★ K
	Advanced Course for Non-Newton Fluid	2	●			Takahashi (T)	A ● K
	Radiative Heat Transfer and Solar Energy Engineering	2		●		Yamada (N)	★ K
	High Energy Materials Engineering	2	●			Katsumi	★
	Advanced Non-Ferrous Metal Materials	2		●		Homma (T)	★ K
	Fracture Mechanics	2		●		Miyashita (Y)	A ◎ ■ K
	Strength of Advanced Materials	2			●	Miyashita (Y) & Otsuka (Y)	☆ ■ K

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Advanced Instrumental Analysis for Materials	1	●			Suzuki(Tsu),Suematsu,Tanaka(K),Matsubara, Homma(To)& Tanaka(S)	① ★
	Advanced Course for Microstructure of Materials	2	●			Nanko	K
	Advanced Study on Mathematical Design	2		●		Kurahashi	★
	Advanced Lecture on Solid State Physics	2		●		Takeda	A ● K
	Social Innovation	2		●		Yamamoto (M) , Kamimura (S) & Nanko	
	Anisotropic Engineering	2		●		Nakayama	E A I K
	Physics of Laser Materials Processing	2	●			Mizoshiri	★
	Bioengineering	2	●			Shoji	★
	Total	51					

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program
②: Recommended to be taken in the second year of the Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Can be conducted in English for SDG Professional Course students
■ Due to content overlap, "Fracture Mechanics" and "Strength of Advanced Materials" cannot be taken together.
I: Information subject recommended to be taken
K: Industry-Associated Subject for Teacher's License Certification
S: Safety subject recommended to be taken

○ Mechanical Engineering recommends the following major subjects from other majors.

Mechanical Engineering - Recommended Subjects

Recommended major of Mechanical Engineering - Course Name	Electrical, Electronics and Information Engineering	Materials Science and Engineering/Bioengineering	Civil and Environmental Engineering
Mechatronics Engineering	Advanced Course of Digital Image Processing	Advances in cell motility	
Smart Factory	Mathematical and Data Science	Electric Properties of Solids Advanced Molecular	Advanced Structural Analysis
Environment and Energy Engineering	Energy Conversion and Control Engineering	Electric Properties of Solids Advanced Molecular Genetics	Advanced Hydraulics Advanced Environmental Information Survey Engineering Advanced Topics on Atmospheric and Hydrospheric Sciences 2

Electrical, Electronics and Information Engineering

[Diploma Policy]

Electrical, Electronics and Information Engineering has set the following five attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. Acquisition of fundamental knowledge as engineers and researchers in the fields of electrical, electronics, and information engineering; necessary advanced expertise; applied skills in information technology; and a safety mindset.
2. Acquisition of the abilities to ascertain technological trends and gather information in one's field of interest and associated disciplines from a broad international and cross-disciplinary perspective.
3. Acquisition of the practical developmental capability for advancing original research and development based on social conditions and trends in research and development.
4. Possess an awareness of the intellectual property aspect of developed technologies, the ability to communicate information domestically and internationally, and the capacity to enhance one's own abilities by flexibly incorporating new information.
5. Gain an understanding of the various effects that technology can have on society, and possess the ability to make ethical decisions.

[Curriculum Policy]

Electrical, Electronics and Information Engineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. Acquisition of fundamental knowledge as engineers and researchers in the fields of electrical, electronics, and information engineering; necessary advanced expertise; applied skills in information technology; and a safety mindset.	By taking the elective subjects and advanced experiment subjects offered by Electrical, Electronics and Information Engineering, students will acquire the fundamental knowledge and experimental techniques that form the foundation for engineers and researchers in the fields of electrical, electronics, and information engineering. In addition, students will take multiple elective subjects corresponding to each course (one of the following three courses: Electric Energy and Control Engineering, Electronic Devices and Light Wave Control Engineering, or Information, Telecommunication and Control), data science-related subjects, and safety-related subjects. This will enable students to form a safety mindset and develop high levels of specialized knowledge in each course, mathematics, and data science.
2. Acquisition of the abilities to ascertain technological trends and gather information in one's field of interest and associated disciplines from a broad international and cross-disciplinary perspective.	Students can cultivate global sensibilities by taking university-wide common subjects. In addition, students can gain a cross-disciplinary perspective by taking subjects from other majors. By reading and discussing academic literature on specialized content during Electrical, Electronics and Information Engineering seminars, students will gain a multifaceted understanding of domestic and international advanced/integrated technological trends/information in their own fields of interest and associated disciplines. Based on the ascertained trends and information, students will be able to describe the value of their own research and development activities in their master's thesis.
3. Acquisition of the practical developmental capability for advancing original research and development based on social conditions and trends in research and development.	By explaining the progress of their own research and development projects and discussing the problems and direction during Electrical, Electronics and Information Engineering seminars, students will develop problem-solving skills that fully use their specialized knowledge

	and techniques based on logical thinking. Students may also choose to take overseas internship subjects to further enhance their on-site practical abilities in international collaborative research and development. Students will conduct practical research and development activities with a constant awareness of originality in accordance with social conditions and trends, and will be able to summarize their results in their master's thesis.
4. Possess an awareness of the intellectual property aspect of developed technologies, the ability to communicate information domestically and internationally, and the capacity to enhance one's own abilities by flexibly incorporating new information.	In Electrical, Electronics and Information Engineering seminars, students will discuss the novelty and importance of their developed technologies to promote an understanding of their intellectual property value. In addition, students will use the information obtained from reading and discussing academic literature to expand and deepen their own specialized knowledge from a multifaceted perspective. Furthermore, students will improve their English language abilities by taking subjects on technical English, thereby enabling them to communicate the results of their research and development efforts both domestically and internationally.
5. Gain an understanding of the various effects that technology can have on society, and possess the ability to make ethical decisions.	By taking Research Integrity, which is a compulsory subject, students will learn about the responsible actions that engineers and researchers must take during the series of processes from the start to the end of all research and development activities. In addition, students will be able to understand the fairness to society that is required from research and development activities from an ethical perspective. Furthermore, students will be instructed on the fairness associated with their own research and development activities during Electrical, Electronics and Information Engineering seminars and experiment subjects. In this way, they will be able to conduct these activities while making ethical decisions.

1. Education Objectives

Through the implementation of NUT's fundamental principle of providing an integrated education between the undergraduate and master's programs, the objective of this major is to provide an advanced education and research guidance in multidisciplinary fields in order to nurture the development of practical leading engineers who are able to contribute to society after graduation. This major has established 3 courses linked with the 3 corresponding courses offered at the undergraduate level: Electric Energy and Control Engineering Group; Electronic Devices and Light Wave Control Engineering Group; and the Information, Telecommunication and Control Group.

The various courses allow for comprehensive study: the Electric Energy and Control Engineering Group addresses new technologies for energy generation, transport, control, systems, and associated new materials; the Electronic Devices and Light Wave Control Engineering Group addresses semiconductor devices, optical devices, high-performance electronic devices, and the associated applied technologies; and the Information, Telecommunication and Control Group addresses advanced telecommunication and transmission technologies for multimedia communication and ubiquitous networking, as well as information processing and measurement technologies associated with human communications.

2. Education Goals

The goal of this major is to nurture the development of leading engineers and researchers who possess the following capabilities:

(1) Possess the requisite fundamental knowledge as electrical, electronics and information engineers and the advanced expertise required for each course.

(2) Ability to utilize a wide international scope to ascertain technological trends and information from one's field of interest and associated disciplines.

(3) Possess the practical developmental capability for advancing original research and development based on social conditions and trends in research and development.

(4) Awareness of the intellectual property aspect of developed technology and possess the presentation skills to communicate information in both domestic and international settings.

(5) Understand the various effects that technology can have on society, and possess the ability to make ethical decisions.

(6) Ability to take in new information in a flexible manner, and possess the self-learning ability to improve oneself.

3. Subject Organization

The specialized education subjects, credits, course terms, and lecturers-in-charge of this major are shown in the Attached Table.

(1) When choosing elective subjects, students are encouraged to refer to the Program Guide and seek guidance from their academic supervisor.

(2) The "Advanced Experiments on Seminar on Electrical, Electronics and Information Engineering" subjects cover the advanced experiments required to start research in the master's program. In principle, the subject is conducted by each student's academic supervisor.

(3) The “Seminar on Electrical, Electronics and Information Engineering” subjects enable the acquisition of wide comprehensive knowledge related to each student’s research topic and associated fields. Classes are conducted as journal clubs under the supervision of all major academic staff.

However, please note the following with regarding to taking the seminar subjects:

- There are 4 seminar subjects, which in principle should be taken sequentially. (However, students who enroll in September will take Seminar 1 in the second term)
- In principle, students are allowed to take only 1 seminar subject per term.
- Students intending to take more than 1 seminar subject in a single term must obtain approval from their academic supervisor and the major administrators.

(4) The subjects specialized in the information technology in the Master’s Program which are indicated “I” in the column of remarks in the Attached Table are recommended to take.

4. Research Work and Master’s Thesis

The master’s thesis will be based on the consolidated results of research conducted over the 2 years of the master’s program under the research guidance of the academic supervisor. The acceptance or rejection of each thesis will be evaluated based on strict screening criteria, such as the incorporation of creative ideas and original experimental results.

In order to complete this major, students must take the subjects as stipulated in the Program Guide, acquire 30 credits or more (including 9 credits from the compulsory subjects of this major), and pass the master’s thesis screening and final examination.

The standard schedule for subject-taking and completion procedures is as follows:

(1) Research Laboratory Assignment

<NUT Graduates> Second term of the third undergraduate year

<Non-NUT Graduates> After enrolling to the master’s program

(2) Schedule (For Students Enrolling in April and Completing in March)

Master’s Program, First Year;

April: Deciding the student’s academic supervisor

Deciding the research topic

May: Submission of Annual Research Plan (Annual Plan of Thesis Research Guidance)

March: Interim presentation and assessment of the master’s thesis (2 examiners)

Master’s Program, Second Year;

April: Confirmation of the student’s academic supervisor

April: Confirmation of the research topic

May: Submission of Annual Research Plan (Annual Plan of Thesis Research Guidance)

November: Preliminary screening of the master’s thesis

End of November to Start of December: Submission of the Academic Degree Application Form

Start of December: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

January: Designation of the screening committee

End of January to Start of March: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

(3) Schedule (For Students Enrolling in September and Completing in August)

Master's Program, First Year;

September: Deciding the student's academic supervisor

Deciding the research topic

October: Submission of Annual Research Plan (Annual Plan of Thesis Research Guidance)

August: Interim presentation and assessment of the master's thesis (2 examiners)

Master's Program, Second Year;

September: Confirmation of the student's academic supervisor

September: Confirmation of the research topic

October: Submission of Annual Research Plan (Annual Plan of Thesis Research Guidance)

April: Preliminary screening of the master's thesis

Middle of May: Submission of the Academic Degree Application Form

Late May: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

June: Designation of the screening committee

Middle of June to Start of July: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

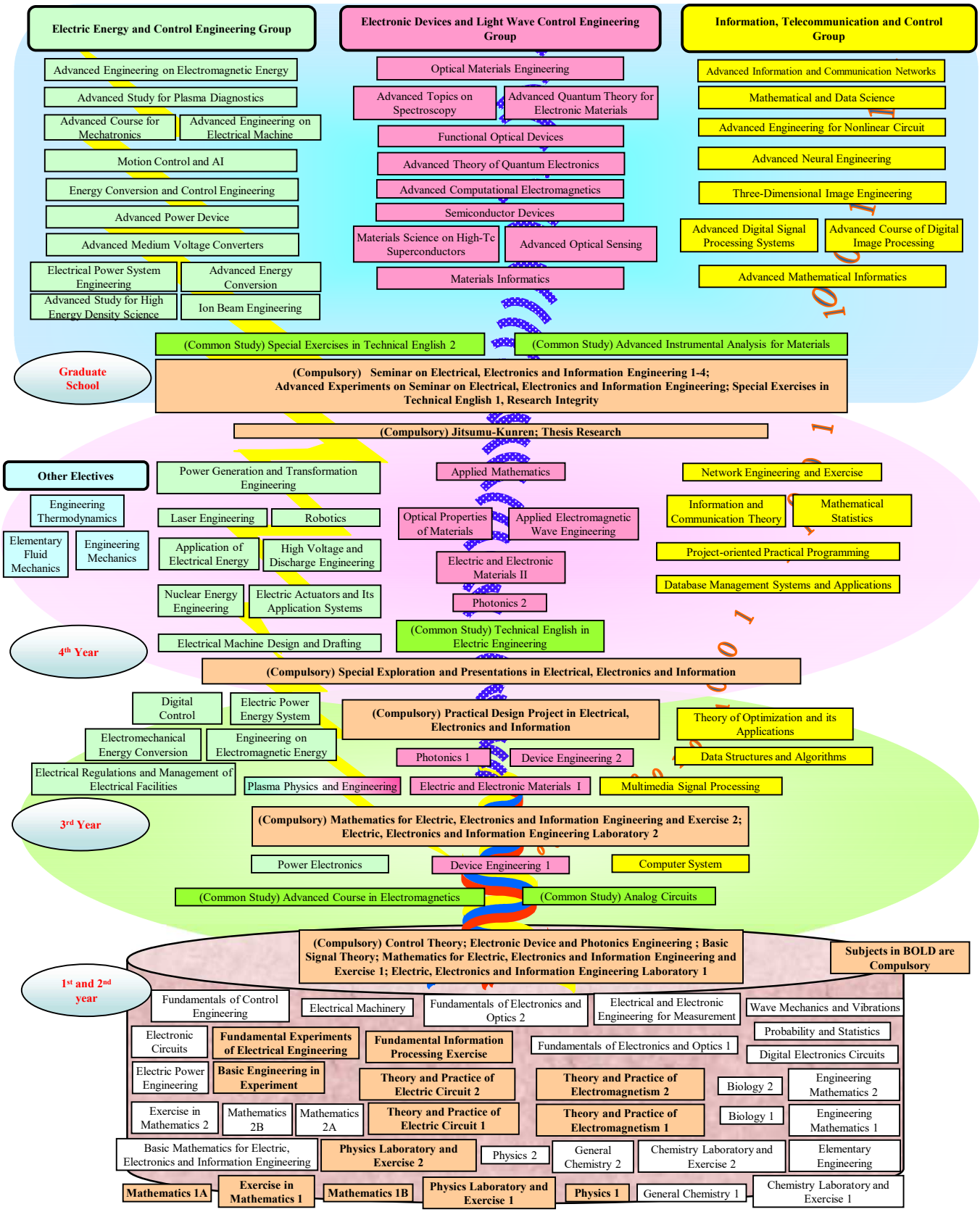
Presentation of the examination results and decision review on degree conferral

Degree conferral council

(4) Presentations at Scientific Conferences

Students are encouraged to present their master's research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

Electrical, Electronics and Information Engineering Program — Subject Organizational Diagram



Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective		Subject Name	Credits	1st Year to 2nd Year Term 1	Term 2	Term 3	Lecturer-in-Charge	Notes
Compulsory		Seminar on Electrical, Electronics and Information Engineering 1	1	●	(●)		Staff	① A
		Seminar on Electrical, Electronics and Information Engineering 2	1	(●)	●		Staff	① A
		Seminar on Electrical, Electronics and Information Engineering 3	1	●	(●)		Staff	② A
		Seminar on Electrical, Electronics and Information Engineering 4	1	(●)	●		Staff	② A
		Advanced Experiments on Seminar on Electrical, Electronics and Information Engineering	3	●	(●)†		Staff	① A K
		Special Exercises in Technical English 1	1	●			Jiang, Sasaki (Toru) & Li	★
		Research Integrity	1	●*	●*		<1st Term> Chair, ※ Uchitomi <2nd Term> Chair, ※ Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
		Total	9					
Elective	Electric Energy and Control Engineering	Motion Control and AI	2		●		Yokokura, Thao & ※Ohishi	E I A K
		Advanced Engineering on Electromagnetic Energy	2		●		Jiang	A K
		Advanced Course for Mechatronics	2		●		Miyazaki	O ★ K S
		Energy Conversion and Control Engineering	2	●			Itoh (J)	O A K
		Advanced Power Device	2	●			※Ueno, ※Nakazawa, ※Onozawa, ※Yamazaki & ※Fujishima	O ★
		Advanced Medium Voltage Converters	2	●			※Tamate, ※Kaneko, ※Okuma, & ※Toba	E ★ S
		Advanced Study for High Energy Density Science	2		●		Kikuchi	O A K
		Advanced Study for Plasma Diagnostics	2	●			Sasaki (Toru)	★ A K
		Electrical Power System Engineering	2	●			Miura	O A K
		Advanced Engineering on Electrical Machine	2		●		Hidaka	E ★ K S
		Advanced Energy Conversion	2		●		Kusaka	O ★
		Ion Beam Engineering	2		●		Takahashi (Kazumasa)	E ★
	Electronic Devices and Light Wave Control Engineering	Materials Science on High-Tc Superconductors	2	●			Suematsu	O ★ A K
		Semiconductor Devices	2	●			Unuma	E A K
		Advanced Theory of Quantum Electronics	2		●		Sasaki (Tom)	A K
		Optical Materials Engineering	2		●		Ono	A K
		Technology for Electronic Materials Synthesis	2	●			Okamoto (T)	A K
		Advanced Quantum Theory for Electronic Materials	2	●			Kato (A)	A K
		Advanced Topics on Spectroscopy	2	●			Tanaka (K)	A K
		Materials Informatics	2		●		Yamashita(To)	A K
		Functional Optical Devices	2		●		Kimura (M)	E A K
		Advanced Computational Electromagnetics	2		●		Tamayama	A I K
		Advanced Optical Sensing	2		●		Sakamoto	★
	Information Telecommunication and Control	Advanced Course of Digital Image Processing	2	●			Iwahashi	E A K
		Mathematical and Data Science	2		●		Manada	E I A K
		Advanced Information and Communication Networks	2		●		※Watabe	O A K

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective		Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Information Telecommunication and Control	Advanced Engineering for Nonlinear Circuit	2	●			Tsubone	E A K
		Three-Dimensional Image Engineering	2		●		Endo	E A K
		Advanced Digital Signal Processing Systems	2	●			Sugita	O A K
		Advanced Neural Engineering	2	●			Nambu	E A K
	Common	Advanced Instrumental Analysis for Materials	1	●			Suzuki(Tsu),Suematsu,Tanaka(K), Matsuhara	① ★
		Special Exercises in Technical English 2	1		●		Jiang & Drier	★
		Total	62					

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided
2) In the “term” column, † indicates that master's students who participate in "Practice and Training through the Study Project on Electrical, Electronics and Information Engineering" in the first term of their first year must immediately take “Advanced Experiments on Seminar on Electrical, Electronics and Information Engineering” in the following term.

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program
②: Recommended to be taken in the second year of the Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the-Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Can be conducted in English for SDG Professional Course students
I: Information subject recommended to be taken
K: Industry-Associated Subject for Teacher's License Certification
S: Safety subject recommended to be taken

○ Students in the Electrical, Electronics and Information Engineering are recommended to take the following subjects from other majorts
The following are recommended for each of the courses

This is to provide an education that links related disciplines to cultivate thinking methods with a flexible and wide perspective on the research conducted during the Jitsumu-Kunren experience in the undergraduate program and front-line research.

Electric Energy and Control Engineering Group

Advanced Automation (Mechanical Engineering)

Electronic Devices and Light Wave Control Engineering Group
Advanced Lecture on Solid State Physics (Mechanical Engineering)

Information, Telecommunication and Control Group
Computational Intelligence (Information and Management Systems Engineering)

○ Due to content overlap, the following subjects cannot be taken together:
・Advanced Engineering on Electromagnetic Energy and Advanced Engineering on Radiation Physics (Nuclear Technology)
○ Due to content overlap, the following subjects cannot be taken together:
・Advanced Engineering on Electromagnetic Energy and Advanced Engineering on Radiation Physics (Nuclear System Safety Engineering)
・Advanced Study for High Energy Density Science and Advanced Engineering on Particle Beam Physics (Nuclear System Safety Engineering)

Information and Management Systems Engineering

[Diploma Policy]

Information and Management Systems Engineering has set the following four attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. (Overall Abilities) Acquisition of the ability to think scientifically and rationally, the ability to insightfully observe people and society, and a safety mindset that will contribute to a healthy and comfortable lifestyle as well as the realization of a diverse and sustainable information society.
2. (Specialized Abilities) Acquisition of a safety mindset and specialized knowledge in the fields of data science, applied informatics, and management that are needed to make broad social contributions as a leading information technology engineer or researcher within an information society.
3. (Practical Abilities) Acquisition of practical and creative abilities to utilize one's expertise in data science, applied informatics, and management in problem solving in order to make broad social contributions as a leading information technology engineer or researcher within an information society.
4. (Communication Abilities) Acquisition of communication abilities, international sensibilities, and language skills that facilitate extensive and active roles both in Japan and overseas as an engineer and researcher.

[Curriculum Policy]

Information and Management Systems Engineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. (Overall Abilities) Acquisition of the ability to think scientifically and rationally, the ability to insightfully observe people and society, and a safety mindset that will contribute to a healthy and comfortable lifestyle as well as the realization of a diverse and sustainable information society.	Students will gain a wide range of specialized knowledge as engineers and researchers through common subjects (including safety and information security-related subjects) and subjects from other majors. Through the compulsory Research Integrity subject, students will increase their understanding of the social responsibilities and ethics required of engineers and researchers.
2. (Specialized Abilities) Acquisition of a safety mindset and specialized knowledge in the fields of data science, applied informatics, and management that are needed to make broad social contributions as a leading information technology engineer or researcher within an information society.	The major offers subject groups centered on data science, applied informatics, and management. Students will be provided with an in-depth specialized education on artificial intelligence and data mining (advanced information technology fields) as well as human factors engineering and user interfaces (applied information technology fields). Furthermore, students will also undergo specialized instruction on management strategies and business models, which are important elements in an advanced information society; as well as on sustainability and energy economics, which are more global safety-related issues.
3. (Practical Abilities) Acquisition of practical and creative abilities to utilize one's expertise in data science, applied informatics, and management in problem solving in order to make broad social contributions as a leading information technology engineer or researcher within an information society.	Seminars and advanced design/practical training subjects are offered. Under the guidance of academic staff in charge of the laboratories, students will develop practical and creative abilities to independently conduct the processes of exploring and discovering problems, formulating objectives and implementing plans for solving these problems, and interpreting and discussing the results.

4. (Communication Abilities) Acquisition of communication abilities, international sensibilities, and language skills that facilitate extensive and active roles both in Japan and overseas as an engineer and researcher.	Seminars and advanced design/practical training subjects are offered to foster the abilities to organize knowledge, structure logic, and present results. Students will strengthen their language skills through foreign language subjects, English e-Learning, and English journal clubs. These skills will be comprehensively developed through the preparation of the master's thesis. In addition, students will be provided with opportunities to conduct practical research and development overseas.

1. Education Objectives

The objective of this major is to develop leading engineers/researchers/managers who have the practical abilities to research and develop creative information technologies and management models; as well as actualize new products, systems, services, and businesses in order to play an active role at the international level and contribute to the safety and the sustainable development of society.

2. Education Goals

In order to develop the professionals described above, the goals of this major are the acquisition of the following capabilities:

(1) Advanced ability to create scientific and logical management systems
(2) Advanced ability to actualize management systems by utilizing information technology
(3) Advanced ability to design (plan, design, administer) management systems
(4) Advanced ability to develop information systems
(5) Advanced ability to comprehend the safety, the economic and social environments surrounding management from a global perspective

3. Subject Organization

The specialized education subjects, credits, course terms, and lecturers-in-charge of this major are shown in the Attached Table.

Building on fundamental undergraduate-level knowledge and skills associated with information and management systems, this major will facilitate the acquisition of advanced specialized knowledge and skills in students, as well as develop comprehensive practical abilities within the 3 groups of subjects; Applied Informatics subjects; Data Science subjects; and Management System subjects. The major will also integrate experiments, practical training, and seminars.

4. Research Work and Master's Thesis

The master's thesis will be based on the consolidated results of research conducted over the 2 years of the master's program under the research guidance of the academic supervisor. The acceptance or rejection of each thesis will be evaluated based on strict screening criteria, such as the incorporation of creative ideas.

In order to complete this major, students must acquire 30 credits or more (including 24 credits or more from subjects in the Attached Table [10 credits from compulsory subjects] and 6 credits or more from Common Subjects), and pass the master's thesis screening and final examination.

The standard schedule for subject-taking and completion procedures for students who complete the program in March is as follows:

(1) Research Laboratory Assignment
<NUT Graduates> Second term of the third undergraduate year
<Non-NUT Graduates> After matriculating to the master's program
(2) Schedule

Master's Program, First Year;

April: Deciding the student's academic supervisor

May: Deciding the research topic

Master's Program, Second Year;

April: Confirmation of the student's academic supervisor

May: Confirmation of the research topic

July to August: Interim presentation

November: Preliminary screening of the master's thesis

Start of December: Submission of the Academic Degree Application Form

Start of December: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

January: Designation of the screening committee

End of January to Start of March: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

(3) Schedule (For students enrolling in September and completing in August)

Master's Program, First Year;

September: Deciding the student's academic supervisor

October: Deciding the research topic

Master's Program, Second Year;

September: Confirmation of the student's academic supervisor

October: Confirmation of the research topic

December to January: Interim presentation

April: Preliminary screening of the master's thesis

Start of April to Middle of May: Submission of the Academic Degree Application Form

Late May: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

June: Designation of the screening committee

Middle of June to Start of July: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

(4) Presentations at Scientific Conferences

Students are encouraged to present their master's research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

Information and Management Systems Engineering（Master's Program）

1st & 2nd Year

Compulsory Subjects

- Information and Management Systems Seminar 1
- Information and Management Systems Seminar 2
- Information and Management Systems Seminar 3
- Information and Management Systems Seminar 4
- Advanced Design of Information and Management Systems 1
- Advanced Design of Information and Management Systems 2
- Special Exercises in Technical English 1
- Research Integrity

(Applied Informatics Subjects)

- Measurement of Physiology
- Theoretical Life Science
- Decision Behavior Theory
- Advanced Experimental Psychology
- Advanced Cognitive Science
- Human Behaviour and Data Mining

(Data Science Subjects)

- Machine Learning
- Advanced Information Retrieval Systems
- Advanced Groupware
- Computational Intelligence
- Advanced Information System Design

(Management Systems Subjects)

- Theory of the Firm
- Management of Product Development
- Business Model
- Sustainable Development Theory
- Energy Economics
- Business Strategy

Master's Thesis

(Other)

- English for Information and Management

Information and Management Systems Engineering – Subject Organization Diagram

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective		Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory	Experimental/ Practical Training	Information and Management Systems Seminar 1	1	●			Staff	① A
		Information and Management Systems Seminar 2	1		●		Staff	① A
		Information and Management Systems Seminar 3	1	●			Staff	② A
		Information and Management Systems Seminar 4	1		●		Staff	② A
		Advanced Design of Information and Management Systems 1	2	●			Staff	① A
		Advanced Design of Information and Management Systems 2	2		●		Staff	① A
		Special Exercises in Technical English 1	1	●			Jiang, Sasaki (Toru) & Li	① ★
		Research Integrity	1	●*	●*		<1st Term> Chair, ※ Maruyama <2nd Term> Chair, ※ Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
		Total	10					
	Applied Informatics	Measurement of Physiology	2	●			Nomura	A
		Theoretical Life Science	2	●			Nishiyama	A
		Decision Behavior Theory	2	●			Nakahira	A
		Advanced Experimental Psychology	2	●			Akimoto	★
		Advanced Cognitive Science	2		●		Nakahira & Oiwa	★
		Human Behaviour and Data Mining	2		●		Doi	
	Data Science	Machine Learning	2		●		Kumoi	A I
		Advanced Information Retrieval Systems	2	●			Yukawa	A I
		Advanced Groupware	2	●			Hayama	A I
		Advanced Information System Design	2		●		※Mukai	I
		Computational Intelligence	2		●		※Yamada (K)	A I
	Management System	Theory of the Firm	2	●			Watahiki	O A
		Business Strategy	2		●		Watahiki	A
		Management of Product Development	2	●			Suzuki (N)	A
		Business Model	2	●			※Yurioka	

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective		Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Management System	Sustainable Development Theory	2	●			Li	O S
		Energy Economics	2	●			Li	E A S
	Other	English for Information and Management	2		●		Nishiyama & Ohashi	★
	Total		36					

1) ※ in the lecturer-in-charge column indicates an adjunct lecturer, and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program
②: Recommended to be taken in the second year of the Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Subject available for SDG Professional Course students upon application. For students taking this subject, please confirm with the lecturers-in-charge regarding the time and place of classes
I: Information subject recommended to be taken
S: Safety subject recommended to be taken

○Information and Management Systems Engineering recommends the following major subjects from other majors.

In addition to the major subjects offered by Information and Management Systems Engineering, students are also recommended to take the following specialized subjects from the other majors described below. If students determine that the subject(s) below are necessary for their own research/ studies, they should take the subject(s) after discussions with their academic supervisor. These subjects will be regarded as equivalent to the elective subjects offered in Information and Management Systems Engineering.

• Civil and Environmental Engineering
  Transportation Network Analysis by Big Data

Materials Science and Bioengineering

[Diploma Policy]

Materials Science and Bioengineering has set the following five attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. Students will develop a grounded understanding of chemistry and biology, learn to utilize information technology, and be able to design and create new substances and materials based on atomic and molecular concepts. In addition, students will acquire advanced expertise to analyze the complex mechanisms of living organisms and apply them to engineering, and be able to consider safety issues.
2. By examining case studies, students will understand the development process of new materials/new processes and how unknown biological phenomena were discovered, thereby cultivating a heightened sense of innovation.
3. Students will develop the practical capabilities to advance creative research as engineers and researchers in the fields of materials science and bioengineering with extensive and active roles both in Japan and overseas.
4. Students will develop presentation skills to communicate the results of one's research to a universal audience.
5. Students will understand the various effects that technology can have on society, and be able to make ethical decisions.

[Curriculum Policy]

Materials Science and Bioengineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. Students will develop a grounded understanding of chemistry and biology, learn to utilize information technology, and be able to design and create new substances and materials based on atomic and molecular concepts. In addition, students will acquire advanced expertise to analyze the complex mechanisms of living organisms and apply them to engineering, and be able to consider safety issues.	Students will acquire the fundamental knowledge needed to be engineers and researchers in the fields of materials science and bioengineering through university-wide common subjects, elective subjects in Materials Science and Bioengineering, information-related subjects, and safety-related subjects. In addition, students will acquire higher levels of specialized knowledge through literature reading, journal clubs, and research discussions during Seminars on Materials Science and Bioengineering.
2. By examining case studies, students will understand the development process of new materials/new processes and how unknown biological phenomena were discovered, thereby cultivating a heightened sense of innovation.	In Advanced Experiments of Materials Science and Bioengineering, advanced experiments will be conducted as needed on selected topics in each lecturer's field of expertise, and advanced experiments will also be conducted under the guidance of each student's academic supervisor in their laboratory. In this way, students will learn about the advanced and integrated technologies in their own fields of research and other related fields in Japan and overseas. In Seminars on Materials Science and Bioengineering, students will examine specialized content through literature reading, journal clubs, research discussions, and debates. Accordingly, students will develop problem-solving skills that fully utilize their specialized knowledge and techniques based on logical thinking, and gain a multifaceted understanding of trends and information on materials, bioresources, and processes.

3. Students will develop the practical capabilities to advance creative research as engineers and researchers in the fields of materials science and bioengineering with extensive and active roles both in Japan and overseas.	Throughout the entire duration of the master's program, students will undergo research guidance from their academic supervisors, and will be tasked to summarize their research results in the master's thesis. Furthermore, the major provides opportunities for research internships in which interested students can conduct research and development activities related to their master's research topics in overseas universities, research institutes, and companies (research laboratories).
4. Students will develop presentation skills to communicate the results of one's research to a universal audience.	During the master's thesis presentation sessions, students will present their master's thesis and answer questions. In addition, students will present and discuss the novelty and importance of their own research findings and developed technologies during Seminars on Materials Science and Bioengineering, thereby expanding and deepening their specialized knowledge and developing multifaceted perspectives while cultivating presentation skills.
5. Students will understand the various effects that technology can have on society, and be able to make ethical decisions.	Students will take Research Integrity as a compulsory subject to learn about the responsible actions that engineers and researchers must take during the series of processes from the start to the end of all research and development activities, as well as to understand the fairness to society required for research and development activities from an ethical perspective. In addition, students will receive guidance about fairness in their own research and development activities during Seminars on Materials Science and Bioengineering so that they can conduct these activities while making ethical decisions.

1. Education Objectives

The Materials Science and Bioengineering major aims to develop engineers who can learn, integrate, and implement the following two approaches: the materials science approach to artificially control the structures of the finite varieties of atoms and compounds through combinations and interactions in order to create new materials, as well as the bioengineering approach to discover the engineering applications of biological functions that comprise complex, diverse, and multilevel systems. This major offers a creative educational curriculum that emphasizes the comprehensive acquisition of knowledge on materials science and biotechnology, undertaking of creative research through participation in research projects, and cultivation of the presentation skills needed to make strong impressions when communicating one's research results to an international audience.

This major aims to develop leading engineers and researchers who can succeed internationally and contribute to society's sustainable development; are able to apply information technology to research and development as well as the reformation of production processes; and possess the practical abilities to engage in problem solving in the development of cutting-edge materials that play crucial roles in future creative industries, social changes, the environment, health care, long-term care, and agriculture. In order to develop engineers needed by society with the abilities to tackle these various challenges, teachers in this major are organized into three groups (Resource Utilization Engineering Group, Biological and Environmental Engineering Group, and Materials Creation Engineering Group) and are in charge of subjects that enable students to gain a wide range of expertise in these fields.

2. Education Goals

The goal of this major is to nurture the development of leading engineers and researchers with the following capabilities:

(1) Advanced expertise in materials science and bioengineering grounded in chemistry and biology that can be applied to a wide range of fields (e.g., electrical and electronics engineering, information technology, mechanical engineering, environmental engineering, health care, long-term care, and agriculture) through the design and creation of new materials based on atomic and molecular concepts, as well as through the engineering applications of biological functions founded on an understanding of biological phenomena.

(2) Fundamental knowledge and expertise on existing technologies related to materials science and bioengineering acquired through analyses of case studies, as well as up-to-date knowledge of innovations in new materials, new processes, and biotechnology.

(3) Practical abilities to advance creative research as engineers and researchers in materials science and bioengineering that are extensively active in both Japan and overseas.

(4) Presentation skills needed to communicate the results of research to a universal audience.
(5) Understanding of the various effects that technology can have on society, and ability to make ethical decisions.

3. Subject Organization

The lectures, seminars, and experiment subjects offered in this major are designed to facilitate the acquisition of comprehensive specialized knowledge. The specialized engineering subjects in this major are shown in the Attached Table.

"Advanced Experiments of Materials Science and Bioengineering I and II" are conducted under the guidance of each student's academic supervisor in their laboratories.

"Seminar on Materials Science and Bioengineering I to IV", which are journal clubs and/or research discussions, are conducted under the guidance of each student's academic supervisor over the two-year period of the master's program. Although these subjects are, in principle, conducted in each academic supervisor's laboratory, there may be cases where they are jointly conducted by two or more laboratories with similar specialties. If necessary, "Expert Seminar on Materials Science and Bioengineering I" and "Expert Seminar on Materials Science and Bioengineering II" may be used to replace the credits from two subjects from "Seminar on Materials Science and Bioengineering I to IV".

"Research Integrity" must be taken in either the first or second term.

4. Research Work and Master's Thesis

The master's thesis will be based on the consolidated results of research conducted over the two-year period of the master's program under the guidance of the academic supervisor. The acceptance or rejection of each thesis will be evaluated based on strict screening criteria, such as the incorporation of creative ideas and formulation of conclusions with rigorous scientific basis.

The standard schedule for subject-taking and completion procedures for students who complete the program in March is as follows:

Master's Program, First Year

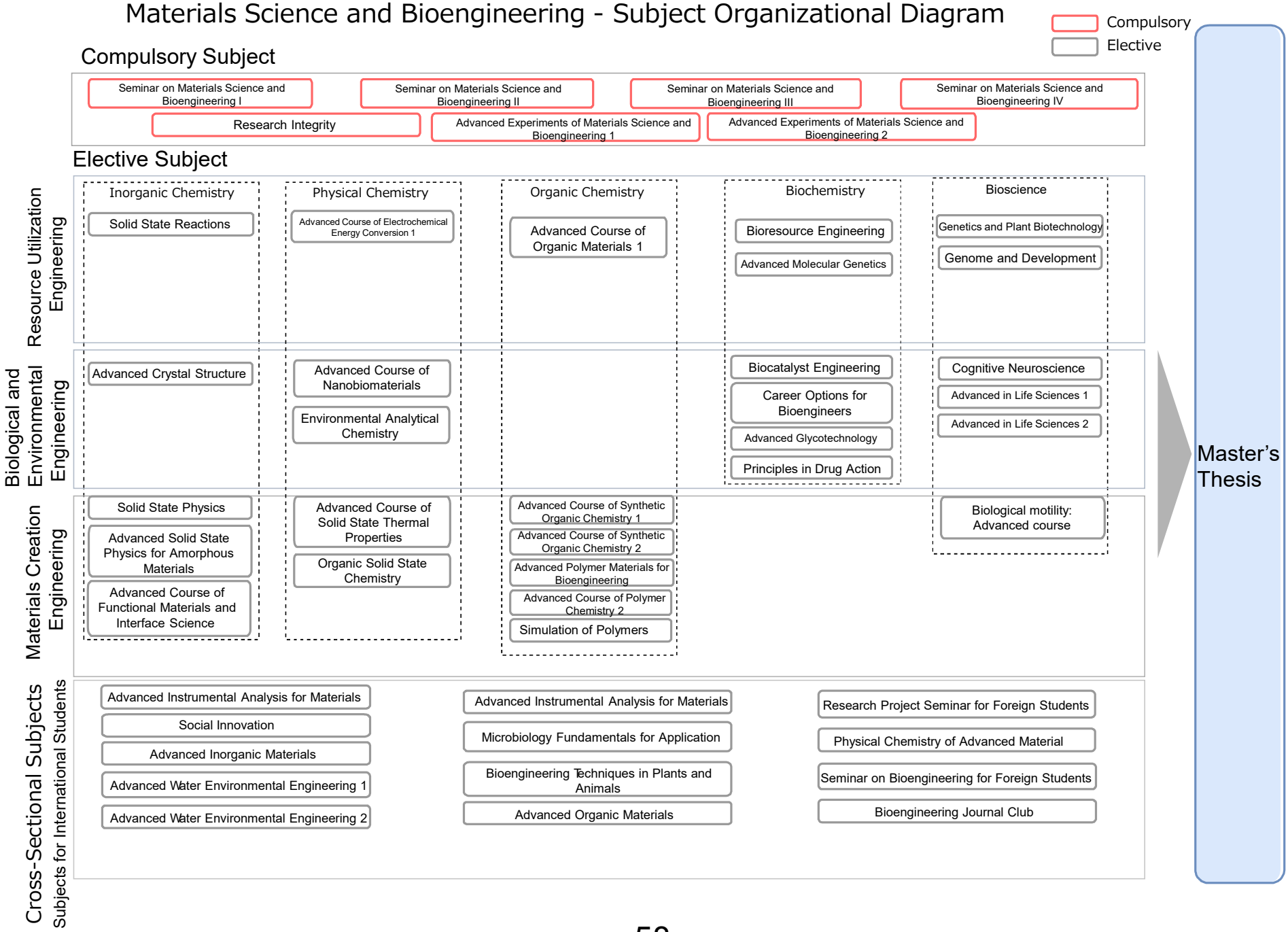
April to May:	Deciding the research topic
December to January:	Interim presentation and assessment

Master's Program, Second Year

April to May:	Confirmation of the research topic
Start of December:	Submission of the *Master's Thesis Screening Application Form*

	and thesis overview (approximately 300 Japanese characters) to the academic supervisor
End of January to March:	Submission of the master's thesis and thesis abstract (approximately 1,000 Japanese characters) Master's thesis presentation Master's thesis screening and final examination Presentation of the examination results and decision review on degree conferral Degree conferral council

Materials Science and Bioengineering - Subject Organizational Diagram



Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory	Seminar on Materials Science and Bioengineering 1	1	●			Staff	① ★
	Seminar on Materials Science and Bioengineering 2	1		●		Staff	① ★
	Seminar on Materials Science and Bioengineering 3	1	●			Staff	② ★
	Seminar on Materials Science and Bioengineering 4	1		●		Staff	② ★
	Advanced Experiments of Materials Science and Bioengineering 1	2	●			Staff	① ★ K
	Advanced Experiments of Materials Science and Bioengineering 2	2		●		Staff	① ★ K
	Research Integrity	1	●*	●*		<1st Term> Chair, ※ Sato (K) <2nd Term> Chair, ※ Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
	Total	9					
Elective	Advanced Crystal Structure	1	●			Saitoh (H)	★ K
	Solid State Physics	1	●			Ishibashi	★ K
	Solid State Reactions	1		●		Tanaka (S)	★ K
	Advanced Course of Solid State Thermal Properties	1		●		Honma (Tsu)	E ★ K
	Advanced Solid State Physics for Amorphous Materials	1		●		Honma (Tsu)	E ★ K
	Biological Motility: Advanced Course	2		●		Fujiwara	O ★ K
	Environmental Analytical Chemistry	2	●			Takahashi (Y)	O ★
	Advanced Course of Nanobiomaterials	1		●		Tagaya	★ K
	Advanced Course of Electrochemical Energy Conversion 1	1		●		Shironita	O ★ K
	Organic Solid State Chemistry	1		●		Imakubo	★ K
	Advanced Course of Organic Materials 1	2	●			Kawahara	O ★ K
	Advanced Course of Polymer Chemistry 2	1	●			Takenaka	E ★ K
	Advanced Course of Synthetic Organic Chemistry 1	1	●			Maekawa	O ★ K
	Advanced Course of Synthetic Organic Chemistry 2	1	●			Maekawa	E ★ K
	Advanced Course of Functional Materials and Interface Science	2		●		Funatsu & Nishikawa	★
	Simulation of Polymers	2	●			Kimura(N)	O ★ I K
	Advanced Polymer Materials for Bioengineering	2	●			Kuwahara	O ★ K
	Career Options for Bioengineers	1	●			Kimura(N) & Isibashi	①
	Social Innovation	2		●		Yamamoto(M), Kamimura(S) Nanko, Sugihara ,& ※ Katsumi(M)	① △ ★ K
	Bioresource Engineering	2		●		Ogasawara	O ★ K
	Genetics and Plant Biotechnology	2	●			Takahara	O ★ K

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Advanced Molecular Genetics	2		●		Masai & Kasai	O ★ K
	Advanced Glycotechnology	2		●		Sato(T)	E ★ K
	Principles in Drug Action	2	●			Takimoto	★ K S
	Cognitive Neuroscience	2		●		Shimoda	E ★ K
	Biocatalyst Engineering	2		●		Takahashi(S)	E ★ K
	Genome and Development	2		●		Nishimura & Ohnuma	★ K
	Advanced in Life Sciences I	2	●			Takimoto, Kuwahara & Fujiwara	★
	Advanced in Life Sciences II	2	●			Kasai & Shida	★
	Advanced Instrumental Analysis for Materials	1	●			Suzuki(Tsu), Tanaka(S), Tanaka(K), Homma(To), Suematsu & Matsuhara	① ★
	Microbiology Fundamentals for Application	2		●		Masai, Ogasawara, Takahashi(S) & Kasai	O ☆ ◆
	Bioengineering Techniques in Plants and Animals	2		●		Takimoto,Ohnuma, Sato(T), Nishimura & Shimoda	☆ ◆
	Bioengineering Journal Club	1	●			Takimoto	☆
	Seminar on Bioengineering for Foreign Students	2		●		Staff	☆ ▼
	Research Project Seminar for Foreign Student	2		●		Staff	☆ ▼(Only for international students under Academic Cooperation Agreement and Double Degree Program)
	Advanced Water Environmental Engineering 1	2	●			Yamaguchi	★
	Advanced Water Environmental Engineering 2	2		●		Yamaguchi	★
	Physical Chemistry of Advanced Materials	2		●		Imakubo, Takahashi(Y), Tagaya, Funatsu & Shironita	O ☆ ◆
	Advanced Inorganic Materials	2		●		Saitoh(H), Ishibashi, Tanaka(S), Homma(Tsu) & Nishikawa	E ☆ ◆
	Advanced Organic Materials	2		●		Takenaka, Maekawa, Kawahara, Kuwahara & Shida	E ☆ ◆

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Expert Seminar on Materials Science and Technology 1	1	●			Staff	Approval of academic supervisor and Chair is required to take the subject
	Expert Seminar on Materials Science and Technology 2	1		●		Staff	Approval of academic supervisor and Chair is required to take the subject
	Total	68					

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program
②: Recommended to be taken in the second year of the Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
△: Can be conducted in English
A: Classes will not be conducted if there are no SDG Professional Course students whose mother tongue is not Japanese who register to take this subject
◆: Offered only for the international students
▼: Offered only for international students under Academic Cooperation Agreement and Double Degree Program
I: Information subject recommended to be taken
K: Industry-Associated Subject for Teacher's License Certification
S: Safety subject recommended to be taken

○ Materials Science and Bioengineering recommends the following major subjects from other majors.

Mechanical Engineering	**Electrical, Electronics and Information Engineering**	**Information and Management Systems Engineering**	**Civil and Environmental Engineering**
Engineering Ultrasound	Advanced Course of Digital Image Processing	Computational Intelligence	Advanced Environmental Information Survey Engineering
			Advanced Water and Soil Environmental

Civil and Environmental Engineering

[Diploma Policy]

Civil and Environmental Engineering has set the following seven attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. **Comprehensive abilities:** Acquire the abilities to comprehensively think about people's happiness and welfare, as well as to consider matters from a multifaceted perspective while always being aware of the relationships between the natural environment, humanity's cultural and economic activities, and infrastructure technologies.
2. **Responsibility:** Understand the effects of infrastructure technologies on society and the natural environment, and gain awareness of the responsibility to serve society by using one's skills and academic knowledge as an engineer and researcher involved in the design and building of infrastructure.
3. **Technical expertise:** Gain knowledge in specialized fields related to social infrastructure, knowledge related to information technology (such as information and communication technology and artificial intelligence), and a safety mindset; as well as acquire the ability to apply these to solve problems.
4. **Problem-solving abilities:** Acquire the abilities to correctly identify the problems being faced while being aware of existing constraints, consolidate the specialized knowledge and skills associated with social infrastructure to explore the issues, formulate clear strategies, and adopt a multifaceted engineering and humanities approach while maintaining the ability to cooperate with others to solve problems as needed.
5. **Explanatory abilities:** Acquire the logical descriptive ability, oral presentation ability, communication skills, and language skills of a globally competent engineer and researcher.
6. **Learning abilities:** Acquire an attitude of active and continuous self-learning and research in order to stay current on the latest advanced specialized technologies and academic knowledge in the real world.
7. **Ability to take action:** Acquire the ability to systematically advance work within existing constraints, organize and proactively publish their results, and apply them to actual problems.

[Curriculum Policy]

Civil and Environmental Engineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. **Comprehensive abilities**: Acquire the abilities to comprehensively think about people's happiness and welfare, as well as to consider matters from a multifaceted perspective while always being aware of the relationships between the natural environment, humanity's cultural and economic activities, and infrastructure technologies.	By taking common subjects, students will gain knowledge of the relationships between infrastructure technologies and humanity's cultural and economic activities. In addition, students will develop the abilities to consider matters from multiple perspectives and think comprehensively about people's happiness and welfare through planning-related subjects.
2. **Responsibility**: Understand the effects of infrastructure technologies on society and the natural environment, and gain awareness of the responsibility to serve society by using one's skills and academic knowledge as an engineer and researcher involved in the design and building of infrastructure.	Students will take Research Integrity as a compulsory subject to gain a deep understanding of the social responsibilities borne by engineers and researchers. By taking major subjects related to general civil and environmental engineering, students will learn about the effects of infrastructure technology on society and the natural environment. In addition, students will comprehensively learn these concepts through research for their master's thesis.
3. **Technical expertise**: Gain knowledge in specialized fields related to social infrastructure, knowledge related to information technology (such as information and communication technology and artificial intelligence), and a safety mindset; as well as acquire the ability to apply these to solve problems.	Students will gain knowledge in specialized fields related to social infrastructure, knowledge related to information technology (such as information and communication technology and artificial intelligence), as well as a safety mindset by taking applied major subjects that span multiple fields of civil and environmental engineering, subjects in other majors, and common subjects. In addition, students will acquire the ability to apply this knowledge and mindset to solve problems by taking Seminars on Civil and Environmental Engineering and Research Work of Civil and Environmental Engineering.

4. **Problem-solving abilities**: Acquire the abilities to correctly identify the problems being faced while being aware of existing constraints, consolidate the specialized knowledge and skills associated with social infrastructure to explore the issues, formulate clear strategies, and adopt a multifaceted engineering and humanities approach while maintaining the ability to cooperate with others to solve problems as needed.	By taking major subjects, students will acquire specialized knowledge and skills associated with social infrastructure. During Seminars on Civil and Environmental Engineering and Research Work of Civil and Environmental Engineering, students will engage in groupwork that enables them to learn to cooperate with others in order to solve problems. Students will also comprehensively learn these abilities through research for their master's thesis.
5. **Explanatory abilities**: Acquire the logical descriptive ability, oral presentation ability, communication skills, and language skills of a globally competent engineer and researcher.	Students will cultivate explanatory abilities by taking common subjects on foreign languages, Seminars on Civil and Environmental Engineering, and Research Work of Civil and Environmental Engineering. Furthermore, in laboratories comprising students of various nationalities, students will cultivate international sensibilities through research activities while learning to collaborate under diverse values. At the same time, students will also comprehensively learn these abilities through research for their master's thesis. Furthermore, the major provides opportunities for students to engage in research and development activities overseas.
6. **Learning abilities**: Acquire an attitude of active and continuous self-learning and research in order to stay current on the latest advanced specialized technologies and academic knowledge in the real world.	Students will foster an attitude of continuous self-improvement by engaging in individual research projects in Seminars on Civil and Environmental Engineering held at each laboratory. In addition, students will comprehensively learn these abilities through research for their master's thesis.
7. **Ability to take action**: Acquire the ability to systematically advance work within existing constraints, organize and proactively publish their results, and apply them to actual problems.	Students will comprehensively learn how to systematically conduct planned research under given conditions through Seminars on Civil and Environmental Engineering, Research Work of Civil and Environmental Engineering, and research for their master's thesis. In addition, students will acquire the ability to proactively present their results by presenting at conferences and at the interim presentation of their master's thesis.

1. Education Objectives

The Civil and Environmental Engineering major aims to develop leading engineers and researchers with the practical and creative abilities to contribute to a sustainable society and respond to major disasters. Students will acquire the specialized knowledge, comprehensive perspectives, and global outlook to appropriately plan, design, build, and maintain various infrastructures in order to support healthy social, cultural, and economic activities in harmony with environment.

The lectures, seminars, and experiments will utilize the integrated education between the undergraduate and master's programs at NUT, and are organized to allow students to acquire advanced expertise and comprehensive knowledge in civil and environmental engineering.

2. Education Goals

The Civil and Environmental Engineering major has set the following specific learning/education goals:

(A) **Comprehensive Ability:** Acquire the ability to comprehensively think about people's happiness and welfare, as well as to think from a multifaceted perspective while always being aware of the associations among infrastructure technologies, natural environment, and people's cultural and economic activities.

(B) **Responsibility:** Understand the effects of infrastructure technologies on society and the natural environment, and gain awareness of the responsibility to serve society by using one's skills and knowledge as an engineer and researcher involved in design and building of infrastructure.

(C) **Technical Expertise:** Learn the advanced knowledge in the major fields related to social infrastructure, as well as knowledge related to information technology, such as Information and Communication Technology and Artificial Intelligence, and understanding of safety, and acquire the abilities to solve problems.

(D) **Problem-Solving Ability:** Acquire the ability to correctly identify problems while being aware of existing constraints, consolidate the specialized knowledge and skills concerning infrastructure to search for issues, formulate clear strategies, and utilize an engineering and multifaceted humanities approach while maintaining the ability to cooperate with others to solve problems when needed.

(E) **Explanatory Ability:** Acquire the logical descriptive ability, the oral presentation ability, the communication ability, and the language abilities of a globally competent engineer and researcher.

(F) **Learning Ability:** Acquire the active self-learning and research abilities in order to master advanced specialized skills and knowledge available in the real world.

(G) **Ability to Take Action:** Acquire the ability to systematically advance work within existing constraints, organize the results, and actively publicize the results and address actual problems.

"Infrastructure technologies" refer to the technologies for appropriate planning, design, building, and maintenance of various infrastructures in harmony with environment.

3. Subject Organization

The subjects, credits, course terms, and lecturers-in-charge of this major are shown in the Attached Table.

(1) In order to complete this major, students must acquire 30 credits or more (including 24 credits or more from subjects in the Attached Table [9 credits from compulsory subjects] and 6 credits or more from Common Subjects), and pass the master's thesis screening and final examination.

(2) "Seminar on Civil and Environmental Engineering 1 to 4" are reading and discussion (journal club) sessions.

In principle, these seminars will be conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the seminars are jointly conducted by two or more laboratories with similar specialties.

(3) "Research work of Civil and Environmental Engineering 1 and 2" subjects are primarily conducted by each student's academic supervisor, and are composed of occasional advanced experiments or practical trainings for various specialized topics selected by the lecturers.

4. Research Work and Master's Thesis

The master's thesis will be based on the consolidated results of research conducted over the 2 years of the master's program under the research guidance of the academic supervisor. Students are encouraged to present their master's research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

○ The standard schedule for subject-taking and completion procedures for students who enroll the program in April and complete the program in March is as follows:

Master's Program, First Year;

April: Deciding the student's academic supervisor

May: Deciding the research topic

Late February to Start of March: A one year completion results of research presentation

Master's Program, Second Year;

April: Confirmation of the student's academic supervisor

May: Confirmation of the research topic

October to November: Interim presentation and assessment of the master's thesis

End of November to Start of December: Submission of the Academic Degree Application Form

Start of December: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

January: Designation of the screening committee

End of January to Start of March: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

○ The standard schedule for subject-taking and completion procedures for students who enroll the program in September and complete the program in August is as follows:

Master's Program, First Year;

September: Deciding the student's academic supervisor

October: Deciding the research topic

A one year completion results of research presentation

Master's Program, Second Year;

September: Confirmation of the student's academic supervisor

October: Confirmation of the research topic

March to April: Interim presentation and assessment of the master's thesis

Start of April to Middle of May: Submission of the Academic Degree Application Form

Late May: Selection of screening committee candidates (1 chief examiner and 2 or more sub-examiners)

Recommendation of screening committee candidates (Chair → NUT President)

June: Designation of the screening committee

Middle of June to Start of July: Submission of master's thesis and thesis abstract (approximately 1,000 characters in Japanese or 250 words in English)

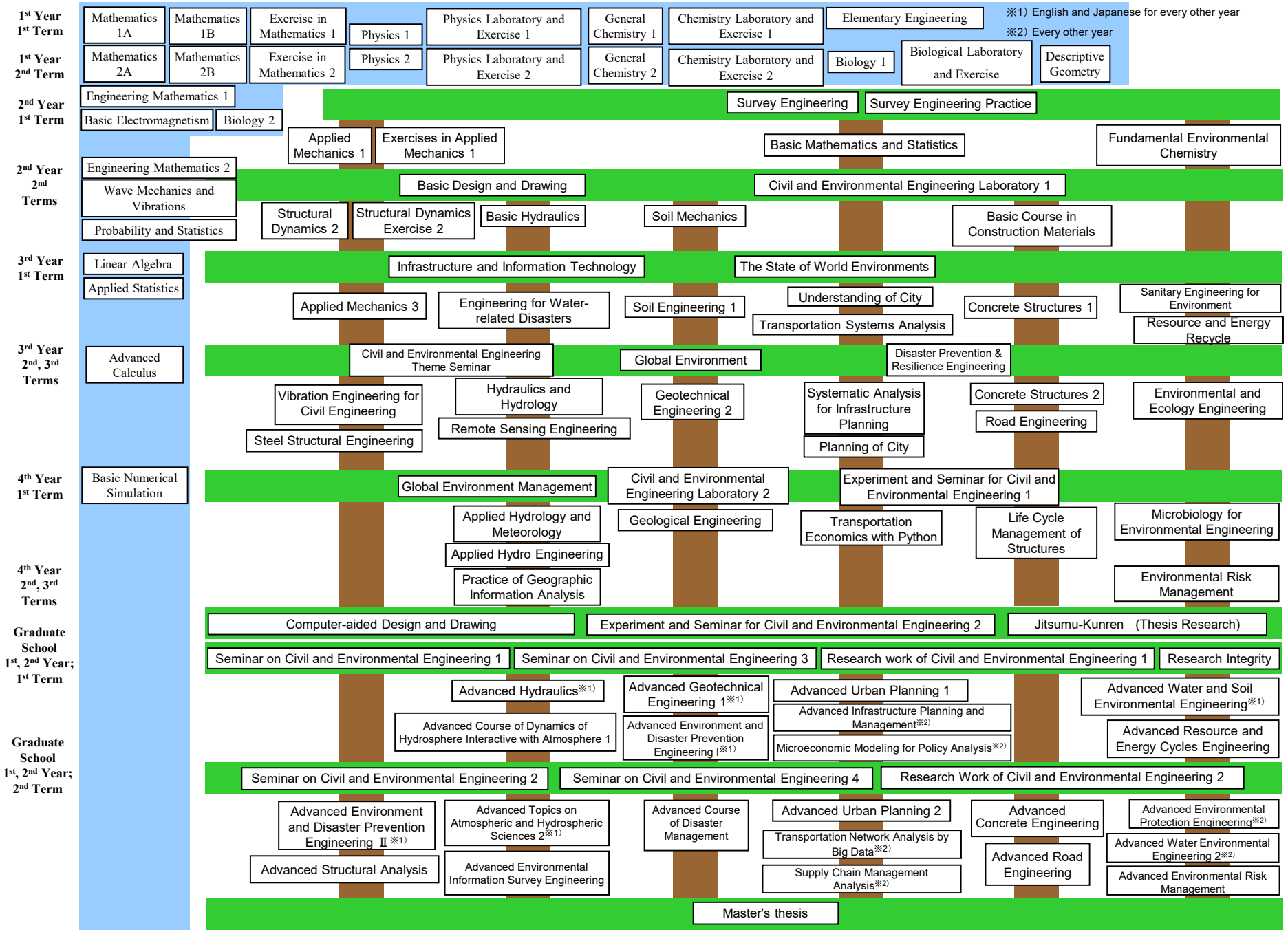
Master's thesis presentation

Master's thesis screening and final examination

Presentation of the examination results and decision review on degree conferral

Degree conferral council

Civil and Environmental Engineering Program – Subject Organizational Diagram



Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory	Seminar on Civil and Environmental Engineering 1	1	●			Staff	① ★
	Seminar on Civil and Environmental Engineering 2	1		●		Staff	① ★
	Seminar on Civil and Environmental Engineering 3	1	●			Staff	② ★
	Seminar on Civil and Environmental Engineering 4	1		●		Staff	② ★
	Research Work of Civil and Environmental Engineering 1	2	●			Staff	★
	Research Work of Civil and Environmental Engineering 2	2		●		Staff	★
	Research Integrity	1	●*	●*		<1st Term> Chair, ※ Maruyama <2nd Term> Chair, ※ Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
	Total	9					
Elective	Advanced Geotechnical Engineering 1	2	●			Toyota	E ★ K
	Advanced Geotechnical Engineering 1	2	●			Toyota	O ☆ K
	Advanced Environment and Disaster Prevention Engineering I	2	●			Ohtsuka (S)	O ★ K
	Advanced Environment and Disaster Prevention Engineering 1	2	●			Ohtsuka (S)	E ☆ K
	Advanced Environment and Disaster Prevention Engineering Ⅱ	2		●		Fukumoto	O ★ I K
	Advanced Environment and Disaster Prevention Engineering Ⅱ	2		●		Fukumoto	E ☆ K
	Advanced course of disaster management	2		●		Ikeda, Shiga & ※Matsuda (Y)	★ K S
	Advanced Hydraulics	2	●			Hosoyamada	O ★ I K
	Advanced Fluid Mechanics	2	●			Hosoyamada	E ☆ ◆ K
	Advanced Course of Dynamics of Hydrosphere Interactive with Atmosphere 1	2	●			Kumakura	★ K
	Advanced Topics on Atmospheric and Hydrospheric Sciences 2	2		●		Lu	O ★ K
	Advanced Topics on Atmospheric and Hydrospheric Sciences 2	2		●		Lu	E ☆ K
	Advanced Environmental Information Survey Engineering	2		●		Takahashi (K)	★ I K
	Advanced Concrete Engineering	2		●		Shimomura	☆ I K
	Advanced Road Engineering	2		●		Takahashi (O)	★ K
	Advanced Structural Analysis	2		●		Iwasaki	★ K
	Supply Chain Management Analysis	2		●		Sano & Kato(T)	O ☆ K

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Elective	Transportation Network Analysis by Big Data	2		●		Sano & Kato(T)	E ☆ I K
	Microeconomic Modeling for Policy Analysis	2	●			Sano	O ☆ K
	Advanced Infrastructure Planning and Management	2	●			Sano	E ☆ K
	Advanced Urban Planning 1	2	●			Matsukawa	★ K
	Advanced Urban Planning 2	2		●		Matsukawa	★ K
	Advanced Water and Soil Environmental Engineering	2	●			Yamaguchi & Hatamoto	O ★ K
	Advanced Water Environmental Engineering 1	2	●			Yamaguchi	E ☆ K
	Advanced Environmental Protection Engineering	2		●		Yamaguchi	O ☆ K
	Advanced Water Environmental Engineering 2	2		●		Yamaguchi	E ☆ K
	Advanced Environmental Risk Management	2		●		Komatsu (To)	★ K
	Advanced Resource and Energy Cycles Engineering	2	●			Himeno	★ K
	Total	56					

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program
②: Recommended to be taken in the second year of the Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Can be conducted in English for SDG Professional Course students
◆: Offered only for the international students
I: Information subject recommended to be taken
K: Industry-Associated Subject for Teacher's License Certification
S: Safety subject recommended to be taken

○ Due to content overlap, the following subjects cannot be taken together:
・"Advanced Course of Disaster Management" and "Advanced Seismic Safety Engineering and Community Disaster Management" (Nuclear Technology)

○ Civil and Environmental Engineering recommends the following major subjects from other majors.

Mechanical Engineering		Electrical, Electronics and Information Engineering	Materials Science and Technology
Fracture Mechanics	Advanced Course for Non-Newton Fluid		
Advanced Course for Microstructure of Materials	Advanced Compressible Fluid Dynamics	Advanced Course of Digital Image Processing	
Advanced Lecture on Solid State Physics	Tribology		
Advanced Automation	Advanced Construction Machinery Engineering		
	Engineering Ultrasound		

Nuclear Technology

[Diploma Policy]

Nuclear Technology has set the following four attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. Gain knowledge of nuclear energy and nuclear safety, knowledge of next-generation nuclear energy and accelerators/radiation, or both; acquire the ability to comprehend nuclear engineering and quantum engineering from panoramic and integrated perspectives, the ability to utilize information technology, and the knowledge and skills needed to do so.
2. Acquire in-depth knowledge of nuclear physics, radiation physics, materials science and chemistry, thermal fluids, and electrical power generation and transformation technologies that are required for the nuclear industry and applied radiation fields; as well as the ability to fully use one's specialized knowledge and skills.
3. Foster individuals who possess international sensibilities, the ability to collaborate in teams, practical and creative abilities that can contribute to global society, as well as research and development capabilities that can contribute to the sustainable development of society.
4. Acquire the ability to logically construct research content and the communication skills to obtain understanding from others regarding this content as internationally active leading engineers and researchers.

[Curriculum Policy]

Nuclear Technology offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. Gain knowledge of nuclear energy and nuclear safety, knowledge of next-generation nuclear energy and accelerators/radiation, or both; acquire the ability to comprehend nuclear engineering and quantum engineering from panoramic and integrated perspectives, the ability to utilize information technology, and the knowledge and skills needed to do so.	Students will acquire the necessary knowledge and skills by taking multiple elective subjects on "Nuclear Safety Engineering", "Nuclear System Engineering", and "Advanced Radiation Engineering"; as well as taking Nuclear Technology Laboratory. In order to comprehend nuclear engineering and quantum engineering from panoramic and integrated perspectives, students will take subjects from other majors and common subjects to gain a broad range of knowledge. In addition, students will learn to utilize information technology such as data science, and form a safety mindset.
2. Acquire in-depth knowledge of nuclear physics, radiation physics, materials science and chemistry, thermal fluids, and electrical power generation and transformation technologies that are required for the nuclear industry and applied radiation fields; as well as the ability to fully use one's specialized knowledge and skills.	Students will enhance their expertise through literature reading in Seminars on Nuclear Technology, and acquire practical skills in Nuclear Technology Practical. Through their master's thesis research, students will gain an in-depth understanding of specialized knowledge and be able to freely use their acquired techniques.
3. Foster individuals who possess international sensibilities, the ability to collaborate in teams, practical and creative abilities that can contribute to global society, as well as research and development capabilities that can contribute to the sustainable development of society.	Through Special Exercises in Technical English, students will develop English language skills that enable them to collaborate in international teams. Through literature reading in Seminars on Nuclear Technology, students will enhance their abilities to understand the current status of research and development, as well as the technologies required by global society. In Nuclear Technology Laboratory, students will conduct experiments as part of teams comprising students from Japan and overseas, thereby fostering their ability to collaboratively conduct research and development. Students will also develop ethical standards in the Research Integrity subject. In the Nuclear Technology Practical, students will enhance their practical skills in research and development. By engaging in their master's thesis

	research, students will cultivate a mindset of contributing to the sustainable development of society while enhancing their creative research skills. In addition, common subjects are offered to foster the foundation of practical and creative abilities in students.
4. Acquire the ability to logically construct research content and the communication skills to obtain understanding from others regarding this content as internationally active leading engineers and researchers.	Through Special Exercises in Technical English and common subjects, students will develop the English language skills needed for the international dissemination of information. Through literature reading and debates in Seminars on Nuclear Technology, students will learn to construct logic and enhance their communication skills needed to obtain understanding from others. Through Nuclear Technology Laboratory, students will increase their ability to logically explain the content and results of experiments. Through their master's thesis research, students will learn how to construct logic in practice. Students will learn to convincingly explain their research conclusions to others at the interim presentation, preliminary screening, and master's thesis presentation. They will also learn to summarize their findings with clear logic in their master's thesis. Students are encouraged to improve their explanatory abilities by presenting their research at scientific meetings and conferences, and by explaining their work to researchers outside of the university. In addition, the major provides opportunities for students to engage in research and development activities overseas.

1. Education Objectives

The objective of this major is to train practical and leading engineers who are able to ensure safety in the planning, development, and operation of light water reactors, advanced reactors, and nuclear fusion systems, used in nuclear power plants, nuclear reactor equipment manufacturers, nuclear fuel processing companies, and nuclear-related research laboratories around the world through the application of system safety. This major offers subjects that enable the integrated acquisition of system safety engineering knowledge based on nuclear engineering (from nuclear physics to back-end technologies) and risk-based design for graduates of universities or technical college advanced courses who have specialized knowledge in the fundamental engineering fields of mechanical engineering, electrical engineering, materials science, civil engineering, and bioengineering. The subjects are composed of lectures, practical training, and experiments. Together with the consolidation of each student's research activities in their master's thesis and presentation, the major aims to train students in nuclear technology expertise that can prevent catastrophic disasters, even in cases of malfunctions or accidents.

2. Education Goals

The goals of this major are to train nuclear technology engineers and researchers who have the following knowledge/abilities and are able to excel in international society:

(1) Fundamental knowledge related to safety engineering for designing nuclear equipment.
(2) Basic knowledge on communication, risk assessment, and relevant laws for conducting safety management.
(3) Knowledgeable about nuclear physics, materials science and chemistry, thermal hydrodynamics, and electrical power generation and transformation technologies required for the use of nuclear equipment.
(4) Communication ability to obtain understanding from others regarding the logical construct of research content, thereby facilitating the development and spread of new nuclear technologies.

3. Subject Organization

Nuclear technology involves the application of safety technology and safety management to fundamental nuclear technologies, and is centered on ensuring safety for each target device. The subjects in this major include both compulsory subjects and elective subjects, which are divided into 3 main categories: 1) Advanced Radiation Engineering, 2) Nuclear System Engineering, and 3)Nuclear Safety Engineering. Students must acquire a total of 30 credits or more, including 8 credits from compulsory subjects. Students must also take subjects from the 3 elective subject types (4 credits or more from each of the categories) and acquire 6 credits or more from the Common Subjects.

4. Research Work and Master's Thesis

The master's thesis must be based on novel and original research evidence and analytical results, and must be written with clear and logical conclusions that would be accepted even by people with differing opinions. By conducting research activities under the guidance of the main/assistant academic supervisors, students must learn to become sufficiently competent to convince the chief examiner and sub-examiners of their research conclusions in the presentations and question & answer sessions during the interim presentation, preliminary screening, and master's thesis presentation.

The standard schedule for subject-taking and completion procedures for students who matriculate in April and complete the program in March is as follows:

Master's Program, First Year;

April: Deciding the academic supervisor

May: Deciding the research topic

Master's Program, Second Year;

May to June: Interim presentation and assessment of the master's thesis

November to December: Submission of Application Form for Thesis Screening, Selection of screening committee candidates, Preliminary screening of the master's thesis

January to February: Submission of master's thesis and the abstract, the presentation, screening, and final examination

The standard schedule for subject-taking and completion procedures for students who enroll the program in September and complete the program in August is as follows:

Master's Program, First Year;

September: Deciding the student's academic supervisor

October: Deciding the research topic

Master's Program, Second Year;

October to November: Interim presentation and assessment of the master's thesis

April to May: Submission of Application Form for Thesis Screening, Selection of screening committee candidates, Preliminary screening of the master's thesis

June to July: Submission of master's thesis and thesis abstract, master's thesis presentation, screening, and final examination

Students must undergo practical training for a minimum of 2 weeks outside of NUT (either domestic or overseas) during the 1 or 2 years where they are enrolled; they will make a report during the Nuclear Safety Practical held in the final term (third term for those intending to complete the program in that term) of the second year. Students are encouraged to present their master's research content at scientific meetings and conferences in their field of study while they are enrolled at NUT. In particular, it is recommended that they improve their communication skills and foreign language skills by learning to explain their work to researchers from other countries.

Nuclear Technology - Subject Organizational Diagram

		1st Term	2nd Term	3rd Term
Practice Subject		Seminar on Nuclear Technology 1	Seminar on Nuclear Technology 2	Nuclear Technology Practical
		Seminar on Nuclear Technology 3	Seminar on Technology 4	
		Nuclear Technology Laboratory		
		Special Exercises in Technical English 1		
		Research Integrity		
Elective-Compulsory		Basics of Nuclear Technology	Special Exercises in Technical English 2	
	Advanced Radiation Engineering	Nuclear Fusion Systems	Advanced Engineering on Radiation Physics	
		Advanced Instrumental Analysis for Materials	Computational Science	
		Advanced Engineering for Radiation Safety and Detection	Environmental Radioactivity and Biological Impact	
	Nuclear System Engineering	Advanced Lecture on Nuclear and Radiochemistry	Nuclear Fuel Cycle Engineering	
		Reactor Physics and Kinetics	Nuclear Reactor Design	
		Nuclear Materials and Fuels		
	Nuclear Safety Engineering	Nuclear Pwer Reactor and Plant Systems	Advanced Seismic Safety Engineering and Community Disaster Management	
		Advanced Safety and Crisis Management	Nuclear Emergency Planning and Resilience Engineering	
		Advanced Lecture on Nuclear Regulation		

Master's thesis writing, presentation

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective		Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory		Seminar on Nuclear Technology I	1	●	(●)		Staff	① ★
		Seminar on Nuclear Technology Ⅱ	1	(●)	●		Staff	① ★
		Seminar on Nuclear Technology Ⅲ	1	●	(●)		Staff	② ★
		Seminar on Nuclear Technology Ⅳ	1	(●)	●		Staff	② ★
		Nuclear Safety Laboratory	1	●			Staff	① ★ K
		Nuclear Technology Practical	1	(●)		●	Staff	★
		Special Exercises in Technical English 1	1	●			Jiang, Sasaki (Toru) & Li	① ★
		Research Integrity	1	●*	●*		<1st Term> Chair & ※Uchitomi <2nd Term> Chair & ※Sato (K)	① *Classes are held in Japanese in the first term and English in the second term. Students must take either of these classes.
		Total	8					
Elective		Basics of Nuclear Technology	2	●			Staff	① ★
		Special Exercises in Technical English 2	1		●		Jiang & Drier	①
Elective	Advanced Radiation Engineering	Nuclear Fusion Systems	2	●			Kikuchi	★ K
		Advanced Instrumental Analysis for Materials	1	●			Suzuki(Tsu),Suematsu,Tanaka(K),Matsubara, Homma(To)&Tanaka(S)	① ★
		Advanced Engineering for Radiation Safety and Detection	1	●			Suematsu, Matsumoto	★
		Advanced Engineering on Radiation Physics	2		●		Jiang	★ K
		Computational Science	2		●		Kikuchi	E I ★ K
		Environmental Radioactivity and Biological Impact	2		●		Ohta(T)	★
	Nuclear System Engineering	Advanced Lecture on Nuclear and Radiochemistry	2	●			Suzuki (Ta) & Ohta(T)	★ K
		Reactor Physics and Kinetics	2	●			Takezawa	★ K
		Nuclear Materials and Fuels	2	●			Suzuki(T) & ※Amaya & ※Suya	★
		Nuclear Fuel Cycle Engineering	2		●		Suzuki(Ta) & Ohta(T)	★ K
		Nuclear Reactor Design	2		●		Takezawa & ※Takase	① ★
	Nuclear Safety Engineering	Nuclear Power Reactor and Plant Systems	2	●			Takezawa & ※Kohama	K S
		Advanced Safety and Crisis Management	2	●			Suematsu, Oba, ※Okano, ※ Kurosawa & ※Sosa	K S
		Advanced Lecture on Nuclear Regulation	2	●			Otsuka (Y)	★ S
		Advanced Seismic Safety Engineering and Community Disaster Management	2		●		Ikeda ~~&~~, Shiga, ※Matsuda (Y)	★ K S
		Nuclear Emergency Planning and Resilience Engineering	2		●		Sano, Oba	S
Total			33					

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided
2) In the "Term" columns, ( ) indicates that the subject may be taken outside of the designated term

【Symbols in the Notes Column】

①:	Recommended to be taken in the first year of the Master's Program
②:	Recommended to be taken in the second year of the Master's Program
E:	Conducted during even-numbered years according to the Reiwa Calendar
O:	Conducted during odd-numbered years according to the Reiwa Calendar
◎:	Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
★:	Conducted in both Japanese and English
A:	Can be conducted in English for SDG Professional Course students
I:	Information subject recommended to be taken
K:	Industry-Associated Subject for Teacher's License Certification
S:	Safety subject recommended to be taken

○ Students in the Nuclear Technology are recommended to take the following subjects from other majors.
- Advanced Thermal Engineering (Mechanical Engineering)
- Advanced Study for Plasma Diagnostics (Electrical, Electronics and Information Engineering)
- Advanced Resource and Energy Cycles Engineering (Civil and Environmental Engineering)

○ Due to content overlap, the following subjects cannot be taken together:
- "Advanced Engineering on Radiation Physics" and "Advanced Engineering on Electromagnetic Energy" (Electrical, Electronics and Information Engineering)
- "Advanced Seismic Safety Engineering and Community Disaster Management" and "Advanced Course of Disaster Management" (Civil and Environmental Engineering)

System Safety Engineering

[Diploma Policy]

System Safety Engineering has set the following four attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. Acquisition of a system safety mindset and principles that integrate and apply safety technologies and management skills; Acquisition of research capabilities and practical capabilities that enable the real-world application of advanced expertise in each field to innovative technologies and management.
2. Cultivation of high ethical standards and fundamental system safety-related skills required for system safety research and practical operations.
3. Acquisition of fundamental specialized abilities to apply a system safety mindset and principles.
4. Acquisition of globally applicable expertise in system safety-related fields, knowledge of information technology, and abilities to practically implement technology in society.

[Curriculum Policy]

System Safety Engineering offers a systematic curriculum based on the following policies in accordance with the Curriculum Policy of the Master's Program in Engineering.

Diploma Policy	Curriculum Policy
1. Acquisition of a system safety mindset and principles that integrate and apply safety technologies and management skills; Acquisition of research capabilities and practical capabilities that enable the real-world application of advanced expertise in each field to innovative technologies and management.	The organization of system safety, history and principles of safety, and the relationship between safety and management will be taught in the compulsory subject group. In addition, the major will teach research methodologies and guide students in detecting and researching system safety-related issues.
2. Cultivation of high ethical standards and fundamental system safety-related skills required for system safety research and practical operations.	Research Ethics and Engineering Ethics are compulsory subjects. To foster fundamental abilities, lectures and practical training will be held on risk assessment, drafting of safety standard proposals and safety design proposals, safety certification, and organizational safety management.
3. Acquisition of fundamental specialized abilities to apply a system safety mindset and principles.	To foster their applicative abilities, students will learn about the fields of safety technologies, standards and certification, as well as policy and management through lectures in the elective-compulsory subject group.
4. Acquisition of globally applicable expertise in system safety-related fields, knowledge of information technology, and abilities to practically implement technology in society.	Lectures will be held on mechanical safety, electrical safety, functional safety, safety evaluation methods, and other topics. In these lectures, students will acquire knowledge of information technology. Furthermore, internships will be offered in safety certification agencies and safety technology research institutions in Japan and abroad. Students can take subjects from other majors, and common subjects are elective-compulsory.

1. Education Objectives

Within the complex combinations of hardware/software, people, and laws/standards, there exist vulnerabilities where human error and mechanical failure can occur. In order to ensure safety, there is a need to closely examine all stages (design-manufacture-utilization) of a system's life cycle to preemptively and systematically expose the possible causes of hazards, analyze and assess their effects, and implement appropriate safety measures. "System Safety" refers to the methodological system designed to implement these steps, and involves the integrated application of safety technologies and management skills. As modern society has become more innovative and global, new technologies are being utilized in practical applications with increasing speed. In order to lead the world in implementing these new technologies, it is essential to first incorporate safety features before they are provided to society. To do so, there is a need for a theoretical system to ensure safety in new technologies before practical implementation, and a societal demand for research to construct the principles of system safety.

System Safety Engineering provides an education in system safety to both general students and working adult students. This major will develop individuals with cutting-edge knowledge and high ethical standards, in-depth academic knowledge that can be adapted to various safety-related challenges and new technologies, and logical thinking abilities and creativity—in other words, they will possess research capabilities; these individuals will also have outstanding abilities to solve real-world problems in safety—in other words, they will possess practical capabilities.

To produce such individuals, this major has set the following education objectives:

> System Safety Engineering aims to develop individuals with cutting-edge knowledge and high ethical standards, in-depth academic knowledge that can be adapted to various safety-related challenges and new technologies, and logical thinking abilities and creativity—in other words, they will possess research capabilities; these individuals will also have outstanding abilities to solve real-world problems in safety—in other words, they will possess practical capabilities.

2. Education Goals

The Degree Conferment Policy (Diploma Policy), including the abilities that students should acquire, is as follows:

System Safety Engineering has set the following four attainment targets for students in accordance with the Diploma Policy of the Master's Program in Engineering.

1. Acquisition of a system safety mindset and principles that integrate and apply safety technologies and management skills; Acquisition of research capabilities and practical capabilities that enable the real-world application of advanced expertise in each field to innovative technologies and management.
2. Cultivation of high ethical standards and fundamental system safety-related skills required for system safety research and practical operations.
3. Acquisition of a system safety mindset and principles that integrate and apply safety technologies and management skills, as well as the fundamental specialized abilities to apply that mindset and principles.
4. Acquisition of globally applicable expertise in system safety-related fields, knowledge of information technology, and abilities to practically implement technology in society.

The first item in the Diploma Policy above applies to the research capabilities and practical capabilities of the individuals described in Section 1, the second item applies to cutting-edge safety-related knowledge and high ethical standards, the third item applies to system safety that integrates and applies safety technologies and management skills, and the fourth item applies to cutting-edge safety-related technology.

3. Subject Organization

3.1. Curriculum Organization and Implementation Policy (Curriculum Policy)

The major's educational principle is the instruction of safety that is based on international standards and is not reliant on people, i.e., system safety. In accordance with this principle and the Curriculum Policy of the Master's Program in Engineering, System Safety Engineering offers a systematic curriculum based on the following items. (Refer to the **Attached Table.**)

1. The organization of system safety, history and principles of safety, and the relationship between safety and management will be taught in the compulsory subject group. In addition, the major will teach research methodologies and guide students in detecting and researching system safety-related issues.
2. Research Ethics and Engineering Ethics are compulsory subjects. To foster fundamental abilities, lectures and practical training will be held on risk assessment, drafting of safety standard proposals and safety design proposals, safety certification, and organizational safety management.
3. To foster their applicative abilities, students will learn about the fields of safety technologies, standards and certification, as well as policy and management through lectures in the elective-compulsory subject group.
4. Lectures will be held on mechanical safety, electrical safety, functional safety, safety evaluation methods, and other topics. In these lectures, students will acquire knowledge of information

technology. Furthermore, internships will be offered in safety certification agencies and safety technology research institutions in Japan and abroad. Students can take subjects from other majors, and common subjects are elective-compulsory.

Items 1–4 in the Curriculum Policy listed above correspond to items 1–4 in the Diploma Policy (Section 2).

The curriculum is characterized by its design to develop individuals with cutting-edge knowledge and high ethical standards, in-depth academic knowledge that can be adapted to various safety-related challenges and new technologies, and logical thinking abilities and creativity—in other words, they will possess research capabilities; these individuals will also have outstanding abilities to solve real-world problems in safety—in other words, they will possess practical capabilities.

3.2. Education Method and Recommended Subject Plan

In accordance with the major's educational principle (detailed at the start of Section 3.1) and based on the System Safety Subject Organization (**Attached Figure 1**), students will systematically take a series of compulsory subjects, elective-compulsory subjects, elective subjects, and combined lecture/practical training subjects (System Safety Study 1 to 4) as shown in the **Attached Table**. In this way, students will gain a wide range of specialized knowledge on system safety, including safety principles, engineering ethics/research ethics, research methodologies, and systematic specialized fundamental abilities.

Students will acquire knowledge by taking the subject groups shown in the upper levels of **Attached Figure 1**, and apply this knowledge to the specialty-specific safety fields presented in the lowest level. As this major will "guide students in detecting and researching system safety-related issues" (outlined in Curriculum Policy item 1 in Section 3.1), students will expand their learning as they acquire knowledge from each academic supervisor's field of expertise.

Specialty-specific safety spans a highly diverse range of fields to accommodate each student's occupation, needs, and interests. The major offers subjects on the following popular topics that have a relative degree of commonality: safe use of robots (mechanical-related field), workplace safety and health promotion through safety and health management (labor-related field), and safety measures in the medical setting (medical and welfare-related field). Other topics can also be learned during the master's research in accordance with each student's occupation, needs, and interests. This fundamental and foundational knowledge will be imparted through the groups of subjects presented in the layers above the lowest specialty-specific safety layer (**Attached Figure 1**), and the master's research will be conducted based on this systematic learning.

Attached Figure 2 shows a recommended model plan of subjects that are taken over the standard program duration of 2 years. With reference to this model, students will be guided to formulate a study plan centered on their own fields of interest that fulfill the completion criteria for the Master's Program in Engineering and this major. The subjects shown in italics in **Attached Figure 2** are offered every year, and should be taken by students in either their first or second year with consideration to their personal prior knowledge.

Students must earn a total of 30 credits or more to complete the program. Of these, 7 credits must be from compulsory subjects, 6 credits or more from elective-compulsory subjects, and 17

credits or more from elective subjects (including 6 credits from common subjects. Please refer to the Program Guide for common subject offerings). However, students who have been admitted through the entrance examination for working adults can be considered to have already acquired a certain level of practical technical skills in society. Therefore, these students may take major subjects instead of 6 credits from common subjects. In addition, students who have already taken relevant subjects in other graduate schools may apply to transfer their credits to this major. These will be mainly recognized as credits from elective subjects, and shall not exceed 6 credits. Students who intend to apply for transfer credit approval must obtain the *Transfer Credit Approval Application Form* from the Division of Academic Affairs, and submit the completed form to the President of NUT together with the results transcript from the relevant university and the syllabus of the relevant subject.

4. Class Methods

In this major, general students and working adult students will take classes together despite their differences in real-world experience. Lecturers will judiciously ascertain each student's portfolio, and compensate for the excesses and deficiencies among the different students. In this way, the major will not lead to confusion arising from the differences in types of students, but will instead seek to connect them through mutual edification.

General students who lack practical knowledge of actual safety conditions in society and manufacturing sites will be provided with supplementary information by supervisors, and will also jointly participate in classes with working adult students. As many working adult students have work obligations during the weekdays, classes will mainly be conducted on Saturdays and Sundays in order to allow them to continue working while furthering their postgraduate studies. General students will also take these same lectures. The time schedule, which is the same as other classes, is as follows: 1st Period: 8:50–10:20; 2nd Period: 10:30–12:00; 3rd Period: 13:00–14:30; and 4th Period: 14:40–16:10. There may be cases where unavoidable work responsibilities result in a student's absence from class. In cases where students are absent for less than half of a subject's total lecture hours, these missed classes may be compensated through supplementary classes or question/answer sessions with the lecturers through online methods. If the lecturers consider that a student has taken more than two-thirds of the total classes, the student shall be eligible to undergo a performance evaluation through an examination or report.

For the compulsory subjects System Safety Study 1 to 4, which cultivate fundamental abilities in research, joint classes (combined lectures/ practical training) will be conducted for all enrolled general and working adult students at specified class venues (Nagaoka or Tokyo) during the start, middle, and later parts of the course. When classes are in session, students will report to their academic supervisor, receive guidance, and submit a report of their practical training results. General students will do this directly, whereas working adult students will do this directly or through online methods.

In order to cultivate cutting-edge research capabilities and practical capabilities in safety technologies, safety certification, and other topics, this major offers domestic and overseas internships in safety certification agencies and safety technology research institutions in Japan and abroad.

- Students will have individual meetings with their academic supervisors to decide their internship host and practical training topic.
- Before commencing the internship, students will conduct preparatory studies according to their academic supervisors' instructions. They will then engage in analyses, research, and practical training during the internship. The results will be compiled into a report.
- During the internship period, students will report to their academic supervisors and receive instruction when required, either directly or through online methods.
- Students will present their internship results at a presentation session.

The internship period and duration will be decided with consideration to the requirements of both the internship hosts and students. Students will not be allowed to participate in both overseas and domestic internships.

5. Research Work and Master's Thesis

5.1. Research Fields

In addition to fostering the development of individuals with research capabilities and practical capabilities, this major will facilitate research that explores the theoretical systems of safety. The knowledge obtained from such research can then be applied as the basis of awareness campaigns and actively communicated to society. Furthermore, by collaborating with affiliated government organizations in Japan, the program can help the staff of these agencies to understand and apply system safety in their work. This can contribute to the widespread understanding of the importance of safety throughout society.

5.2. Schedule

The standard research schedule for students who complete the program in March is as follows:

<M1 Period>

April: Survey of each student's preferences for academic supervisor and research topic
May: Decision on academic supervisors and research topics

The master's thesis interim presentation and assessment will be conducted between March of M1 and May of M2.

<M2 Period>

End of November to Start of December: Submission of the *Academic Degree Application Form*
Start of December: Selection of review committee candidates (1 chief examiner and 2 or more sub-examiners)
Recommendation of review committee candidates (Program head → NUT President)
January: Designation of the review committee candidates
January to March: Submission of the master's thesis and thesis abstract (approximately 1,000 Japanese characters)
Master's thesis presentation

Master's thesis review and final examination
Presentation of the examination results for degree conferral
Deliberation on degree conferral

March: Degree conferral ceremony

5.3. Research Guidance

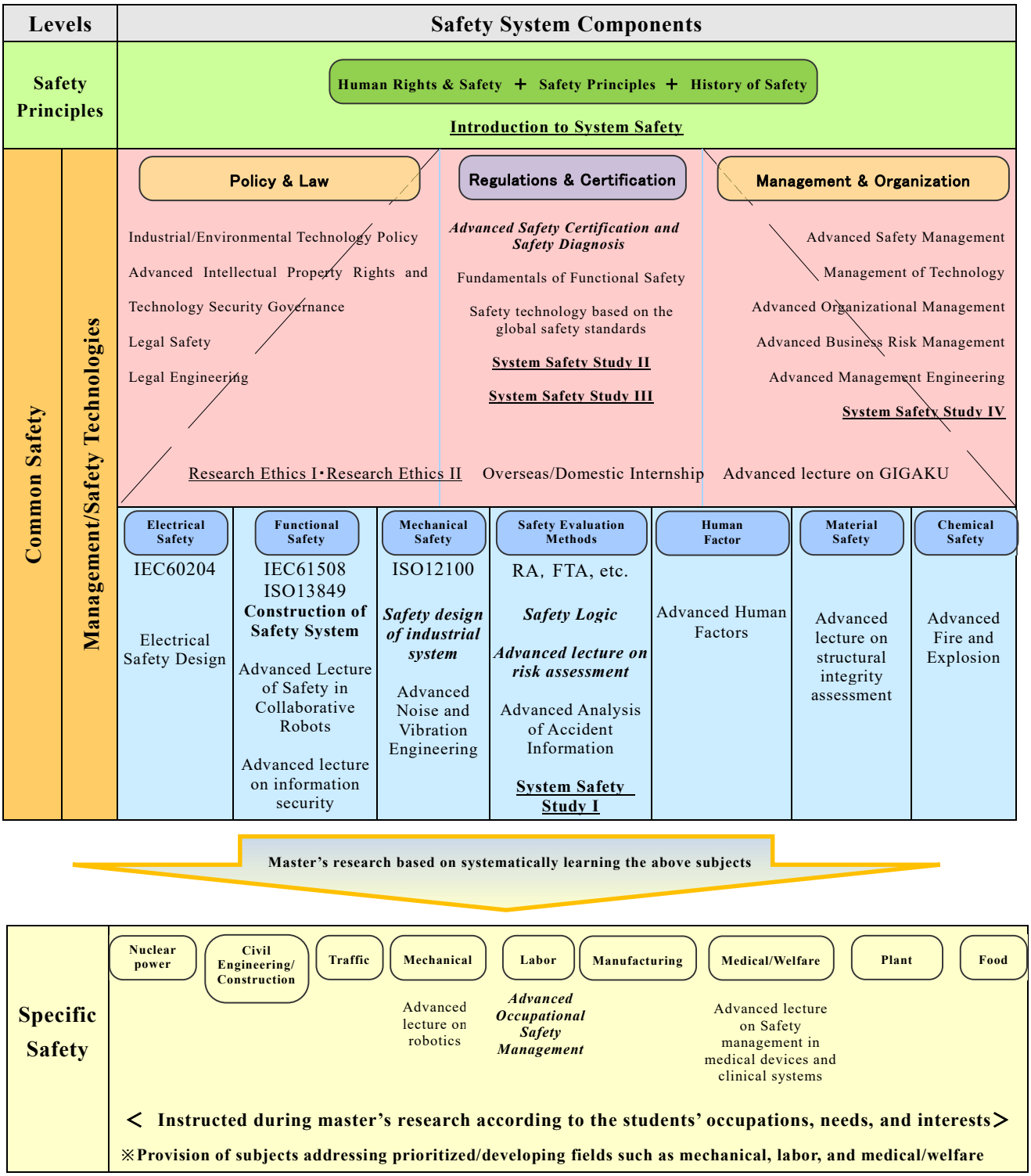
Students will have individual meetings with their academic supervisors (main supervisor and co-supervisor) to determine their research topics. In particular, working adult students are likely to choose topics developed from real-world problems or independently identified topics. Therefore, it is especially important for them to have individual meetings with their academic supervisors to decide on the appropriateness and feasibility of their proposed research topics from a system safety perspective.

Students will think scientifically about safety problems using all that they have learned from this major, and advance their research to propose solutions based on their combined knowledge of system safety. Students will report their research progress at a presentation session involving all students. During the research period, students will report to their academic supervisors and receive instruction when required, either directly or through online methods.

In research, students will be guided in setting their research topics that takes into consideration the link between "general students with flexible mindsets unrestricted by experience" and "working adult students with diverse real-world experience" to provide complementary and mutual edification in the creative activity of research. The research results will be consolidated in each student's master's thesis and submitted.

6. Other Considerations

As this major provides a practical education, the lecturers may discuss case examples that are restricted to the class venue. Please be aware that such restricted information should not be disclosed to anyone outside of NUT.



Underlined & bold font: Compulsory subjects; ***Italicized & bold font***: Elective-compulsory subjects; Standard font: Elective subjects

Attached Figure 1. System safety subject organization

Year	Subject Term	Subject Classification	System Safety Principles and Common Fields		
			A: Safety Technology Fields	Management Fields	
				B: Standards/Certification Fields	C: Policy/Management Fields
2nd Year	Latter Term	Compulsory			System Safety Study IV (2-3)①
		Elective-Compulsory	***Construction of Safety System (2)***	***Advanced Safety Certification and Safety Diagnosis (3)***	***Advanced Occupational Safety Management (2)***
					Advanced Safety Management (2)
		Elective	*Fundamentals of Functional Safety (2)*		*Advanced Organizational Management (2)*
			Advanced Fire and Explosion (2)O		*Advanced Business Risk Management (3)*
			Advanced lecture on robotics (2)O		Legal Engineering (2)①O
			e-Advanced lecture on structural integrity assessment O		
	Earlier Term	Compulsory	***Research ethics 1 (1) ・ Research ethics 2 (1)***		
				System Safety Study III (1-2) ①	
		Elective-Compulsory	***Safety Logic (1)***		
			Advanced lecture on risk assessment (1)		
			Safety design of industrial system (1)		
		Elective	*Safety technology based on the global safety standards (1)*		*Industrial/Environmental Technology Policy (1)*
			Electrical Safety Design (1)	Advanced lecture on GIGAKU (1)① O	*Management of Technology (1)*
			Advanced Human Factors (2) E	Overseas Internship (1)	Advanced Management Engineering (1) O
			Advanced Analysis of Accident Information (1) ① O		
			Domestic Internship (1)		
			e-Advanced lecture on structural integrity assessment O		
1st Year	Latter Term	Compulsory		System Safety Study II (2-3)①	
		Elective-Compulsory	***Construction of Safety System (2)***	***Advanced Safety Certification and Safety Diagnosis (3)***	***Advanced Occupational Safety Management (2)***
					Advanced Safety Management (2)
		Elective	*Fundamentals of Functional Safety (2)*		*Advanced Organizational Management (2)*
			Advanced Noise and Vibration Engineering (2)E		*Advanced Business Risk Management (3)*
			Advanced Lecture of Safety in Collaborative Robots (2)E		Advanced Intellectual Property Rights and Technology Security Governance (2)E
			Advanced lecture on Safety management in medical devices and clinical systems E		Legal Safety (2)①E
	Earlier Term	Compulsory	**Introduction of System Safety (1) ①, Research ethics・Engineering ethics *(1)***		
			System Safety Study I (1-2)①		
		Elective-Compulsory	***Safety Logic (1)***		
			Advanced lecture on risk assessment (1)		
			Safety design of industrial system (1)		
		Elective	*Safety technology based on the global safety standards (1)*		*Industrial/Environmental Technology Policy (1)*
			Electrical Safety Design (1)		*Management of Technology (1)*
			Advanced lecture on information security (1) ① E		
			Advanced lecture on Safety management in medical devices and clinical systems E		

Note) Earlier Term: Terms 1-2; Latter Term: Terms 2-3; Numbers in parentheses: Course term; Encircled numbers: Number of credits (if not written, the subject is worth 2 credits); Italics: Subjects offered every year; O: Subjects offered during odd-numbered years; E: Subjects offered during even-numbered years.

Attached Figure 2. Recommended program plan (Applicable to students who matriculated in AY2024)

Attached Table (Curriculum Table) (Applicable to students who matriculate in AY2024)

Compulsory/ Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory	System Safety Study I	1	1			Staff	Taken in 1st year ★
	System Safety Study II	1		1		Staff, ※Hoshi	Taken in 1st year ★
	System Safety Study III	1	1			Staff, ※Sugita	Taken in 2nd year ★
	System Safety Study IV	1		1		Staff	Taken in 2nd year ★
	Introduction of System Safety	1	1			Abe (M), Tsuda, Houjo, ※Hoshi	Taken in 1st year ★
	Research Ethics I	1	1			Houjo, ※Sato (Ku)	★
	Research Ethics II	1	1			Houjo, ※Nakano	★
	Total	7					
Elective-Compulsory	Advanced Occupational Safety Management	2		2		Houjo, ※Oga & Matsukura	
	Advanced Safety Management	2		2		Yamagata , Zhang , ※Ohta	★
	Advanced Safety Certification and Safety Diagnos	2			2	※Asai, ※Yoshikawa & ※Shimizu	
	Safety Logic	2	2			※Hata	★
	Advanced lecture on risk assessment	2	2			Kimura (T), ※Matsuda	★
	Safety design of industrial system	2	2			※Nakamura, ※Tanabe (I), ※Shimizu	★
	Construction of Safety System	2		2		Miyoshi, ※Kushibiki	★
	Total	14					
Elective	Overseas Internship	2	2			Staff	Taken in 2nd year ★
	Domestic Internship	1	1			Staff	Taken in 2nd year
	Industrial/Environmental Technology Policy	2	2			Yamagata	★
	Management of Technology	2	2			Yamagata	★
	Advanced Organizational Management	2		2		Tsuda	
	Advanced Business Risk Management	2			2	※Okabe	
	Fundamentals of Functional Safety	2		2		Sakai	
	Safety technology based on the global safety standards	2	2			※Tsukiyama& ※Shimizu	
	Electrical Safety Design	2	2			Sakai	
	Advanced Intellectual Property Rights and Technology Security Governance	2		2		※Yoshii	E
	Advanced Fire and Explosion	2		2		Suzuki (M), Sato	O ★
	Advanced Noise and Vibration Engineering	2		2		Abe (M), ※Taura, ※Fujino	E ★
	Advanced Lecture of Safety in Collaborative Rob	2		2		Miyoshi	E ★
	Advanced lecture on robotics	2		2		Miyazaki, ※Onishi (M), ※Ohishi	O
	Advanced lecture on GIGAKU	1	1			Kimura (T), ※Taura, ※Kitagawa, ※Nabeshima	O
	Advanced Analysis of Accident Information	1	1			Zhang	O ★
	Advanced lecture on information security	1	1			Kimura (T), Zhang, ※Nakamura	E
	Advanced Management Engineering	2		2		Tsuda	O
	Advanced Human Factors	2		2		Miyachi	E
	Legal safety	1		1		※Hongan	E
	Legal Engineering	1		1		※Okamoto (T)	O
	Advanced lecture on structural integrity assessment	2		2		Otsuka (Y), ※Kubo	e-learning O ★
	Advanced lecture on Safety management in medical devices and clinical systems	2		2		Otsuka (Y), ※Nozawa	e-learning E ★
	Total	40					

※ indicates an adjunct lecturer.

In the Notes column, "E" indicates subjects conducted during even-numbered years according to the Reiwa Calendar, "O" indicates subjects offered during odd-numbered years according to the Reiwa Calendar, and "★" indicates subjects conducted in both Japanese and English.

Common Subjects

1. Objectives of the Common Subjects

In order to develop advanced leading engineers with the practical and creative abilities to bring about global technological development, NUT aims to instill program-specific expertise and technical skills, as well as the following 3 abilities and qualities: multifaceted and flexible thinking abilities in science and technology, strategic technological development abilities, and global engineer leadership skills. The common subjects are designed to teach students these abilities and qualities, and are offered to students from all programs.

2. Subject Organization

The common subjects are organized into the following 10 groups to support the development of the aforementioned abilities and qualities. Information in parentheses indicate the corresponding undergraduate and master's programs diploma policies (Degree Conferment Policies 1–4).

○Multifaceted and flexible thinking abilities in science and technology (B1, M2)

A. Ability to utilize the concepts and techniques of science and mathematics that support technology.
B. Ability to comprehend technology from the perspectives of life, people, and society.
C. Trained to understand and conceptualize combined technologies involving multiple specialized fields.

○Strategic technological development abilities (B2, M3)

D. Possess the language and logical skills needed to form the basis for understanding, thinking, expression, and dialogue.
E. Ability to consider the effects of technology on safety, environment, and culture.
F. Trained to have technology management skills that can interpret trends in global society and industries.

○Global engineer leadership skills (B4, M4)

G. Ability to communicate about technology in English.
H. Ability to collaboratively work within a team with an international perspective.
I. Ability to perform international competitive activities fairly as an organizational member.

* J. Includes content from multiple groups (A to I).

The university selects the subjects related to Economics and Management, and safety as recommended subjects to learn as engineers. The subjects indicated as "Safety" in the remarks of Attached Table are the subjects related to safety and ones indicated as "Economics and Management" in the remarks of Attached Table are the subjects related to Economics and Management. These subjects are elective and students are strongly recommended to take.

3. Subject Requirements and Criteria

With the exception of subjects for students in graduate school special courses, all common subjects are elective. Students except major in System Safety Engineering require 6 credits or more from these subjects.

Credits for "Cross-cultural Mapping: Developing Your Cultural Awareness" will be awarded based on a total of 2 months or more of overseas experience (applicable only to educational and

research activities conducted at a graduate school). In order to acquire credits, students must attend 3 lectures (intensive) and submit a report before departing for the overseas experience. Therefore, students intending to acquire credits for this subject should take these lectures in advance.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Group	Subject Name	Credits	1st Year to 2nd Year Term 1	Term 2	Term 3	Lecturer-in-Charge	Notes
Elective	A	Modern Mathematics	2		●		Hara	K
		Theory of Mathematical Analysis	2	●			Yamamoto (Ke)	K
	B	Sports Bio-mechanics	2	●			Okushima	
		Social Welfare	2		●		※Yoneyama	
		Introduction of Cognitive Science	2	●			※Kitajima	
		Language and Thought	2		●		Kano & Shigeta	
		Advanced Psychology	2		●		※Yamakawa	
	E	Advanced Safety Engineering	2		●		※Kadowaki	Safety
		Science and Technology in Modern Society	2	●			※Kurihara	
		Advanced Safety and Information Security 1	1		●		Miyoshi, ※Ogino &Itoh(Kosuke)	Safety
		Advanced Safety and Information Security 2	1		●		Miyoshi & ※ Sakurai(Tsu)	Safety
	F	Energy and Economy in Japan	2	●			Li & ※ Itoh (Kokichi)	Economics and Management
		Advanced Business Management	2		●		※Ikushima	Economics and Management
		Japanese Industrial Development and SDGs	2		●		Katsumi(T)	☆ A K Economics and Management
		Gigaku Innovation and Creativity	2	●			Manada	☆
		An outline of Intellectual Property	2	●			※ Yoshii	
		Practice of Idea Prototyping	2	●	●		Kaida, Yamazaki & Adlin	Same content both 1st term & 2nd term
		Practical Work on Venture Flotation Training 1	2		●		Katagawa,Yamaguchi, Suzuki(N) & ※( )	★ Economics and Management
	G	Technological English	2	●			Ikarashi	★
		English for Science and Technology	2	●			Takahashi(M)	★
		English for Academic Purposes	2	●			※Takahashi (A)	★
		Fundamental English for Graduate Students	2		●		Fujii	① ★
		English Presentation Skills	2	●			Nobuhara	★
		Analytical Reasoning and Presentation	2	●			※ Moulinos	① ☆
		Professional Discourse and Presentation	2		●		※ Moulinos	① ☆

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Group	Subject Name	Credits	1st Year to 2nd Year Term 1	Term 2	Term 3	Lecturer-in-Charge	Notes
Elective	H	Language and Understanding of Other Cultures	2	●			Kano	
		Characters in Modern Japanese Literature	2	●			Wakabayashi	
		Cross-cultural Mapping: Developing Your Cultural Awareness	2		●		Kano	
		Social Skills Considering from Diversity	2	●			Yamamoto (M), Nanko & ※Nishihara & ※ Koguchi	
		Role of Creativity and Leadership Development in Enterprise and Business	2		●		Kaida	
Elective	I	International Relations	2	●			※Kuroda	
		Compliance of Corporation	2	●			※ Suenaga	
	J	Introduction to the SDG Practice	2		●		Nanko, ( ) & ※Katsumi (M)	★
		SDGs-recognizing limitations and challenges	2		●		Takimoto	☆ A
Total			66					

1) ※ in the lecturer-in-charge column indicates an adjunct lecturer, and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of Master's Program
E: Conducted during even-numbered years according to the Reiwa Calendar
O: Conducted during odd-numbered years according to the Reiwa Calendar
◎: Conducted in Japanese during even-numbered years and in English during odd-numbered years according to the Reiwa Calendar
●: Conducted in Japanese during odd-numbered years and in English during even-numbered years according to the Reiwa Calendar
☆: Conducted in English
★: Conducted in both Japanese and English
A: Can be conducted in English for SDG Professional Course students
S: SDG Professional Course students are strong encouraged to take this subject
K: Industry-Associated Subject for Teacher's License Certification

The subjects indicated below are elective and students are strongly recommended to take.

Safety
Economics and Management

Special Subjects for International Students

"Japanese for Graduate Students" and "General Affairs of Japan for Graduate Students" subjects are offered only to international students. "Japanese for Graduate Students" subjects account for 6 credits and "General Affairs of Japan for Graduate Students" subjects account for 4 credits, for a total of 10 credits.

In order to take the aforementioned subjects excluding 'General Affairs of Japan for Graduate Students 1-2', students must first take a Japanese language placement test before subject registration.

A maximum of 2 credits earned from these subjects will be counted as common study subject credits for program completion.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term 1	1st Year to 2nd Year Term 2	1st Year to 2nd Year Term 3	Lecturer-in-Charge	Notes
Elective	Japanese for Graduate Students 1-1	1	●			Katano	
	Japanese for Graduate Students 1-2	1		●		Katano	
	Japanese for Graduate Students 2-1	1	●			Nagano	
	Japanese for Graduate Students 2-2	1		●		Nagano	
	Japanese for Graduate Students 3-1	1	●			Lee Iizuka	
	Japanese for Graduate Students 3-2	1		●		Lee Iizuka	
	General Affairs of Japan for Graduate Students 1-1	2	●			Kano	
	General Affairs of Japan for Graduate Students 1-2	2		●		Kano	☆
	Total	10					

【Symbols in the Notes Column】

☆: Conducted in English

Subjects Related to the Practical Study Project for Master's Students

1. Background and Objectives

At NUT, fourth-year undergraduate students who intend to advance to graduate school spend approximately 5 to 6 months in a Jitsumu-Kunren internship at private corporations, public corporations, or government agencies in Japan or overseas. During these internships, the students associate with people who are actively working in related fields, and conduct research on their designated topics with guidance from the on-site host supervisors. In this way, students learn the demands of society for technology, recognize the purpose of academic knowledge, and find a place to demonstrate their creativity. This also allows students to gain practical skills and a better understanding of technology. The students have shown a high degree of satisfaction with this education system through surveys, and society also has a high regard of NUT students who have finished this course (e.g., personnel from corporations have an improved impression of NUT students).

With the aim of nurturing the development of practical and innovative engineers capable of playing an active role at the international level, master's students will also spend a minimum of 3 months participating in the Practical Study Project related to their research topics at overseas universities, research institutions, or corporations (research laboratories). Through this program, students will learn to adopt a global perspective toward research and development, recognize their place and their country's place in the world, and experience working in collaboration with researchers and engineers with different cultures and customs. In this way, NUT aims to deepen master's research, as well as instill in graduates the abilities to assess and act with a wide perspective and consider multiple factors when carrying out their duties as engineers.

2. Subject Organization

① During this Practical Study Project, students will be unable to take subjects that are held at the university. Therefore, students take the following 3 types of subjects as a set, in principle, when participating in the Practical Study Project:

- Replacement subjects for compulsory subjects (seminars, advanced/special experiments) in the affected term
- Major elective subjects
- Specified common subject (A student do not need to take this subject in a case such as if s/he has already earned 6 or more credits of common subjects. If a student is unable to register during the normal subject registration period, the Division of Academic Affairs will compile a list of all students intending to take the subject and contact the lecturer-in-charge. Students will not directly contact the lecturer-in-charge.)

② As shown in the attached table, students can take the subjects available in their own majors, and the credits earned can be accepted as credits for compulsory or elective subjects in the relevant major.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory/Elective			Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Performance Evaluation/ Notes
Major Subjects	Mechanical Engineering	Replacements for Compulsory Subjects	Practical Study Project on Mechanical Engineering	3		●		Staff	Evaluations will be conducted by each student's academic supervisor based on their research activities during the Practical Study Project. Students may replace this subject with one subject from Mechanical Engineering Seminars 1–4, and one subject from Mechanical Engineering Special Practicals 1–2. For second-year students taking this subject, Mechanical Engineering Special Practicals 1–2 can be replaced with elective major subjects.
		Elective	Learning through the Study Project on Mechanical Engineering	6		●		Staff	◇
	Electrical, Electronics and Information Engineering	Replacements for Compulsory Subjects	Practice and Training through the Study Project on Electrical, Electronics and Information Engineering	1	●			Staff	Overall evaluations will be made by each student's academic supervisor based on the results of research activities conducted at the host institution, assessments by the host supervisor, and the content of reports (including seminar-equivalent content). This subject can only be taken during the first or second terms, and can be replaced with one subject from Seminar on Electrical, Electronics and Information Engineering 1A –4B.
		Elective	Learning through the Study Project on Electrical, Electronics and Information Engineering	6	●			Staff	◇ Students may only take this subject if they are taking Practice and Training through the Study Project on Electrical, Electronics and Information Engineering.
		Elective	Learning, Practice and Training through the Study Project on Electrical, Electronics and Information Engineering	7			●	Staff	Overall evaluations will be made by each student's academic supervisor based on the results of research activities conducted at the host institution, acquisition of knowledge/techniques (and corresponding attitude) associated with their research topics, and the content of reports on applied engineering. Students taking this subject cannot simultaneously take Practice and Training through the Study Project on Electrical, Electronics and Information Engineering and Learning through the Study Project on Electrical, Electronics and Information Engineering.
	Information and Management Systems Engineering	Replacements for Compulsory Subjects	Practical Study Project on Information and Management Systems Engineering	3		●		Staff	Students may replace this subject with one subject from Information and Management Systems Seminar 1–4, and one subject from Advanced Design of Information and Management Systems 1–2. For second-year students taking this subject, Advanced Design of Information and Management Systems 1–2 can be replaced with Overseas Advanced Design of Information and Management Systems.
		Elective	Overseas Advanced Design of Information and Management Systems	2		●		Staff	This subject is for second-year students. Students are not allowed to take this subject independently. Second-year students who have taken Practical Study Project on Information and Management Systems Engineering may replace it with this subject as an elective.
		Elective	Overseas Special Exercises in Technical English	1	●			Staff	① Students who have participated in the Practical Study Project in the first term of their first year may replace this with Special Exercises in Technical English.
		Elective	Learning through the Study Project on Information and Management Systems Engineering	6		●		Staff	◇ Students may only take this subject if they are taking Practical Study Project on Information and Management Systems Engineering.
	Materials Science and Bioengineering	Replacements for Compulsory Subjects	Practical Study Project on Materials Science and Bioengineering	3		●		Staff	Evaluations will be conducted by each student's academic supervisor based on their research activities during the Practical Study Project. Students may replace this subject with one subject from Seminar on Materials Science and Technology 1–4, and one subject from Advanced Experiments of Materials Science and Technology 1–2.
		Elective	Learning through the Study Project on Materials Science and Bioengineering	4		●		Staff	◇

Compulsory/Elective			Subject Name	Credits	1st Year to 2nd Year Term 1 2 3	Lecturer-in-Charge	Performance Evaluation/ Notes
Major Subjects	Civil and Environmental Engineering	Replacements for Compulsory Subjects	Practical Study Project on Civil and Environmental Engineering	3	●	Staff	Students may replace this subject with one subject from Seminar on Civil and Environmental Engineering 1–4, and one subject from Research Work of Civil and Environmental Engineering 1–2. (For M2 students taking this subject, Research Work of Civil and Environmental Engineering 1–2 can be replaced with elective major subjects.)
		Elective	Learning through the Study Project on Civil and Environmental Engineering	4	●	Staff	◇
	Nuclear Technology	Replacements for Compulsory Subjects	Practice and Training through the Study Project on Nuclear System Safety Engineering	1	●	Staff	Master's students participating in Practice and Training through the Study Project may replace this subject with one subject from Seminar on Nuclear Safety Engineer 1 –4.
		Elective	Learning through the Study Project on Quantum Science and Radiation	2	●	Staff	◇ Students taking Practice and Training through the Study Project on Nuclear System Safety Engineering may choose to take a maximum of 2 subjects from the Learning through the Study Project subjects.
		Elective	Learning through the Study Project on Nuclear Technology	2	●	Staff	
		Elective	Learning through the Study Project on Advanced Energy Engineering	2	●	Staff	
	System Safety Engineering	Replacements for Compulsory Subjects	Practical Study Project on System Safety Engineering	1	●	Staff	Evaluations will be made by each student's academic supervisor based on the content of their practical research and development activities conducted at the host institution. Depending on the student's research topic, this subject may be used to replace the most relevant subject from System Safety Study 1–4.
		Replacements for Elective Compulsory Subjects	Learning through Study Project on System Safety Engineering	6	●	Staff	◇ For a total of 6 credits, this subject may be used to replace elective-compulsory subjects or used to earn credits from elective subjects that are related to the student's research topic.
Common Subjects		Elective	Cross-cultural Mapping: Developing Your Cultural Awareness	2	●	Kano	Students will take 3 lectures (intensive) and submit a report prior to the Practical Study Project. Students will also submit a post-Practical Study Project report on what they learned about different cultures during their Practical Study Project. Evaluations will be based on both the pre- and post-Practical Study Project reports.

1) ※ in the lecturer-in-charge column indicates an adjunct lecturer, and ( ) indicates that the lecturer is undecided

【Symbols in the Notes Column】

①: Recommended to be taken in the first year of the Master's Program

◇: Each student's grade will be determined by their academic supervisor based on preliminary studies of the research to be conducted at the host institution, as well as reports on applied engineering submitted during the Practical Study Project

Program Guide

Graduate School of Engineering

Doctoral Program in Engineering

1. Overview

This Program Guide addresses the required curricula, subject requirements, and program completion criteria for students of Nagaoka University of Technology (hereafter referred to as “NUT”). The guide was prepared by the Academic Affairs Committee on January 17, 2024, and is based on Article 64 of the School Rules of NUT.

The criteria described here are applicable to students matriculating in 2024.

If there are revisions to the curricula, subject requirements, and graduation criteria, Revisions to the Curriculum Table and other necessary documents will be distributed to enrolled students at the guidance sessions for each academic year conducted at the start of April.

NUT was established as a New Concept University for engineering, with an emphasis on a graduate school that conducts education and research centered on the development of practical technologies.

As such, the mission of NUT is to create new knowledge and technologies, as well as to cultivate human resources with a high level of expertise and creativity. The principle that underlies education and research at NUT is the development of creative abilities associated with *Gigaku* — the science of technologies.

NUT’s doctoral program aims to develop personnel who can conduct fundamental and applied research with a clear sense of purpose, and are able to drive developmental research in pioneering technologies that anticipate industrial demands.

The purpose of this program is to develop practical and creative researchers and engineers with a strong foundation of scientific knowledge and the advanced capabilities required to conduct independent research. In addition, NUT aims to train researchers and engineers who can drive academic research using a wide perspective and flexible thinking ability, as well as possess the enthusiasm and motivation to develop research results into new actual technologies. The curricula are designed according to the objectives of each individual major, and are effectively organized to provide a seamless and consistent education with the master’s program.

2. Subjects, Credits and Period of Classes

The subjects and credits offered by each department in the doctoral program are detailed in the provided subject lists.

The standard amount of time required to earn 1 academic credit involves content for 45 hours of studying, and is calculated using the following criteria:

① Lectures: 15 hours of classes and 30 hours of preparation/review = 1 credit.

② Exercises (Reading and Discussion/Seminar): 30 hours of classes and 15 hours of preparation/review= 1 credit

For details on each subject, please refer to the online version of the Syllabus (URL: https://www.nagaokaut.ac.jp/kyoiku/jyugyou/jyugyou_kamoku/jyugyou_kamoku.html)

The period of classes is set by the academic year. The academic year is divided into three terms; 1st term, 2nd term and 3rd term.

[Terms]

1st term: April 1 to August 31, 2nd term: September 1 to December 31, 3rd term: January 1 to March 31

Class Timetable will be posted at the beginning of the academic year and uploaded on our official website. Students are required to develop a study plan based on the Class Timetable.

（URL：https://www.nagaokaut.ac.jp/kyoiku/jyugyou/timetable.html）

3. Subject Registration

(1) The subjects will, in principle, be conducted strictly according to the curriculum for each major.

(2) Students must register for all subjects that they intend to take during the subject registration period at the start of the first term and second term in which each subject (including intensive lecture subjects) begins.

(3) At the start of each academic year, the Division of Academic Affairs will post Class Timetable on the university's official website.

(4) At the start of each school term, the Division of Academic Affairs will distribute a *Guide to Subject Registration* and a *Subject Registration Form*.

(5) Students must carefully refer to this Program Guide and the Class Timetable, develop a study plan with guidance from their academic supervisors, and register online for subjects based on the posted guides during the subject registration period for each term.

(6) Students must submit the *Subject Registration Form* to the lecturer-in-charge of each intended subject during the subject registration period in order to obtain approval for attending classes.

(7) Students must check the results of their subject registration application online during the subject registration period. After checking the subject registration results, students may (under guidance from their academic supervisors) make modifications, additions, or cancellations to the registered subjects if necessary. These changes must be recorded online during the registration revision period after subject registration.

(8) If a student must cancel registration for a subject due to an unavoidable reason after the registration revision period, the student must submit a *Subject Cancellation Form* to the Division of Academic Affairs.

(9) Although some intensive lecture subjects may have undecided class schedules during the subject registration period, students are still required to register for these subjects (as described in item [2] above) if they wish to take them. In these cases, a registration cancellation period will be provided, and students must follow the cancellation procedure if they no longer wish to take a subject. Students should take note of the registration cancellation procedure and period for intensive lecture subjects, which will be posted on notice boards, etc.

(10) Students are not allowed to take intensive lecture subjects with schedules that completely or partially overlap with other subjects. In such cases, students must cancel their registration for one of the overlapping subjects during the registration cancellation period. If students are found to have taken two subjects with overlapping schedules without cancelling their registration for one, they may be given a failing grade for both subjects.

(11) Please note that if a student has not cancelled registration for a subject and fails to attend classes or sit for an examination, the student will receive an automatic failure for that subject.

4. Examinations and Performance Evaluation

(1) In principle, examinations will be conducted at the end of the school term to conclude the subject. However, examinations may also be conducted at other times at the discretion of the lecturer-in-

charge, with these interim examinations taking the place of the final examination. In addition, some subjects may utilize daily evaluations or reports in place of the final examination.

(2) Students are evaluated using the following grades: S, A, B, C, and D, which are detailed below.

Grade	Meaning	Points	GP
S	Student has thoroughly fulfilled the academic objectives of the subject and has achieved outstanding results	90–100	4
A	Student has thoroughly fulfilled the academic objectives of the subject	80–89	3
B	Student has fulfilled the academic objectives of the subject	70–79	2
C	Student has fulfilled the minimal academic objectives of the subject	60–69	1
D	Student has not fulfilled the academic objectives of the subject	0–59	0

* GP (Grade Point) refers to the points obtained for each grade.
S, A, B, and C are considered passing grades.

(3) Students who pass the final examination of a subject will receive the prescribed credits for that subject. Credits that have already been acquired cannot be cancelled or modified by repeating the subject.

(4) The Grade Point Average (GPA) system has been implemented since 2014 to provide an indicator that allows the comprehensive evaluation of academic achievement, as well as to conform to international grading evaluation schemes.

(5) The GPA is calculated using a credit-weighted average of the GP from all subjects taken by a student, regardless of pass/fail status. However, subjects that are unrelated to program completion are excluded from calculation. In cases where a student has prematurely dropped a subject or failed to sit for an examination, the student will receive a GP score of “zero” for that subject, but its credits shall still be included in the denominator for GPA calculation. GPAs are calculated to 2 decimal places.

(6) Students are to check their subject results online during the following periods: Middle of August for the first term, beginning of February of the subsequent year for the second term, and beginning of March for the third term. Students are to check the bulletin board for details along with the notice indicated in (7).

(7) Students may ask the lecturer in charge of each class directly for confirmation when they have any concerns regarding evaluations/grades. The University has a grade appeal system for students who could not resolve their concern by asking the lecturer. Check the bulletin board for details, as students will need to fulfil conditions for application of grade appeal.

5. Subject Requirements

Students must earn 42 credits or more (including the 30 credits earned during the master’s program) to complete the doctoral program.

6. Program Completion

(1) In order to complete the doctoral program, students must have been enrolled at the Graduate School of Engineering for a minimum of 5 years (for students who have completed the master’s program,

the 2-year duration of that program will be counted toward the requisite years for the doctoral program), earned the prescribed credits, undertaken the necessary research work, submitted their doctoral thesis, and passed the necessary thesis screening and final examination. However, with regard to the period of enrollment, students with particularly outstanding academic performance may be allowed to complete the program after being enrolled for only 3 years or more (for students who have completed the master's program, the 2-year duration of that program will be counted toward the requisite years for the doctoral program).

(2) The doctoral thesis must be submitted before the prescribed deadline during the student's enrollment period.

7. Application for Thesis Screening and Degree Conferral

Applications for thesis screening and degree conferral are to be conducted based on NUT's Degree Rules and the Regulations of Handling of Thesis/Dissertation Screening.

8. Other Points to Note

For undergraduate-level and master's program subjects (limited to subjects where credits have yet to be acquired), the credits acquired will be recognized but will not count toward the credits required for completion of the doctoral program.

Guide to Major Programs

(Doctoral Program in Engineering)

Energy Engineering

[Diploma Policy]

Energy Engineering aims to nurture the development of leading engineers and researchers who have an abundance of academic knowledge in specialized fields such as Energy Systems Engineering, Energy Conversion and Control Engineering, and Energy Materials Engineering; can utilize information technology; and possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and advanced expertise.

To this end, Energy Engineering has set the following five attainment targets to enable students to acquire a broad education through class subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced research abilities needed to independently conduct research in the fields of energy engineering, as well as in-depth scholastic knowledge that forms the foundation of such research.
2. Acquisition of a broad educational ability to comprehend life, humanity, and society from the perspectives of technology and science; the ability to explore new fields based on the scientific principles of integrated technologies covering multiple specialized disciplines; as well as multifaceted and flexible thinking abilities for advanced technology and science.
3. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. Formation of international sensibilities and communication skills balanced with advanced research and technical abilities, as well as global leadership abilities that can lead industries in Japan and the rest of the world.
5. Formation of the ability to effectively communicate one’s area of research not only to researchers in specialized fields, but also to the general public.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through subjects offered by Energy Engineering to facilitate the acquisition of the above targets, and have passed the thesis review based on the doctoral thesis review standards.

[Curriculum Policy]

Energy Engineering will implement the following four items in accordance with the Curriculum Policy of Nagaoka University of Technology's Doctoral Program. Please refer to the Program Guide for information on subject offerings.

1. Compulsory journal club subjects are offered by each academic staff member to foster the students' abilities to fully utilize cutting-edge specialized knowledge and skills in the fields of Energy Systems Engineering, Energy Conversion and Control Engineering, and Energy Materials Engineering.
2. Elective subjects in the fields of Energy Systems Engineering, Energy Conversion and Control Engineering, and Energy Materials Engineering are offered, and students will select these subjects in consideration of their future under the guidance of their academic supervisors. These subjects will foster the acquisition of a broad educational ability to comprehend aspects of life, humanity, and society; the ability to explore new fields through integrated technologies covering multiple specialized disciplines; and multifaceted and flexible thinking abilities for advanced technology and science.
3. Through the aforementioned subjects and doctoral thesis guidance, students will gain research abilities based on high ethical standards, as well as the practical and creative abilities to continue developing research findings until they are actualized as new technologies.
4. Through research internship subjects and the process of presenting their doctoral thesis, students will acquire international sensibilities and communication skills balanced with advanced research and technical abilities, as well as global leadership abilities that can lead industries in Japan and the rest of the world.

1. Although scientific and technological progress has enabled humanity to build advanced civilizations through industrialization, maintaining Japan's level of prosperity requires the development of systems that are suited to Japan's natural environment and can address national challenges such as energy development, energy device development, and energy conservation. However, there is also a need to resolve the complex social problems (e.g., population, urbanization, resource utilization, and the environment) arising from the discordance between nature and human society as a whole.
2. This major focuses on conducting comprehensive developmental research to resolve the aforementioned problems faced by modern society. This involves research on energy systems (ranging from energy development to energy conservation), as well as their underlying energy conversion/control technologies and energy materials development designed to improve device performance.
3. As shown in the Attached Table, this major offers specialized education subjects for Energy System Engineering, Energy Conversion and Control Engineering, and Energy Materials Engineering.
4. All lecture subjects from among those described above are elective. As these subjects are based on each individual lecturer's field of study, there is a high degree of specialization. Therefore, it is important for students to select the subjects while considering their future personal applicability. When choosing elective subjects, students are encouraged to refer to the Program Guide and to seek guidance from their academic supervisors.
5. Journal club sessions (compulsory) are conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the sessions are jointly conducted by two or more laboratories with similar specialties.
6. The doctoral thesis will be based on the consolidated results of research conducted over the three years of the doctoral program under the guidance of the academic supervisor. Students are encouraged to present their doctoral research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 3rd Year Term 1	Term 2	Term 3	Lecturer-in-Charge	Notes
Compulsory	Energy Science 1	3	●			Staff (3 lecturers)	
	Energy Science 2	3		●		Staff (3 lecturers)	
	Researcher Ethics	1	●	●		Staff	Take this subject in the 1st or 2nd term after consultation with academic advisor
	Total	7					
Elective	Advanced Thermal Energy Engineering	2		●		Yamada (N) & Suzuki (M)	
	Advanced Engineering for Fluid Energy	2		●		Takahashi (T) & Yamazaki (W)	
	Advanced Engineering for Energy Conversion and Control	2		●		Itoh (J), Hidaka & Kobayashi (Y)	
	Advanced Engineering for Power Electronics and Mechatronics	2	●			Miyazaki, Yokokura & Miura	
	Advanced Engineering for Electrochemical Energy	2	●			Shironita	
	Advanced Superconducting Material Engineering	2		●		Suematsu	
	Advanced Ceramic Engineering for Energy Harvesting	2	●			Honma(Tsu)	
	Advanced Course on Energy Conversion Materials Science and Engineering	2		●		Takeda	
	Advanced Decarbonization System	2		●		Li	
	Advanced Engineering for Plasma and Nuclear Fusion	2	●			Kikuchi	
	Advanced Engineering for High Energy Density Plasma	2	●			Sasaki (T)	
	Applied Nuclear Chemistry	2	●			Suzuki (T)	
	Advanced Environmental Radioactivity	2	●			Ohta (T)	
	Advanced Biomaterials and Bioengineering	2	●			Tagaya	
	Advanced Ion Beam Engineering	2	●			Takahashi(Kazumasa)	
	Total	30					

All subjects in this table may be taken in English. Students who wish to take lectures in English should confirm this with the lecturer-in-charge when submitting the *Subject Registration Form.*

【Symbols in the Notes Column】

・ Subjects marked with an "S" are offered as part of the Advanced Safety Engineering Course

Information Science and Control Engineering

[Diploma Policy]

Information Science and Control Engineering aims to nurture the development of leading engineers and researchers who have an abundance of academic knowledge in specialized fields such as Intelligent Information Systems Engineering, Mathematical Information Systems Engineering, and Precision Control Engineering; can utilize information technology; and possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and advanced expertise.

To this end, Information Science and Control Engineering has set the following five attainment targets to enable students to acquire a broad education through class subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced research abilities needed to independently conduct research, as well as in-depth scholastic knowledge in the specialized fields of Intelligent Information Systems Engineering, Mathematical Information Systems Engineering, and Precision Control Engineering that forms the foundation of such research.
2. Acquisition of a broad educational ability to comprehend life, humanity, and society from the perspectives of technology and science; the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; as well as multifaceted and flexible thinking abilities for advanced technology and science.
3. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. Formation of international sensibilities and communication skills balanced with advanced research and technical abilities, as well as global leadership abilities that can lead industries in Japan and the rest of the world.
5. Formation of the ability to effectively communicate one’s area of research not only to researchers in specialized fields, but also to the general public.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through subjects offered by Information Science and Control Engineering to facilitate the acquisition of the above targets, and have passed the thesis review based on the doctoral thesis review standards.

[Curriculum Policy]

Information Science and Control Engineering has set the following Curriculum Policy items in accordance with the Curriculum Policy of Nagaoka University of Technology's Doctoral Program. Please refer to the Program Guide for information on subject offerings.

1. Two compulsory subjects (Information Science and Control Engineering 1 and 2) are offered by all academic staff members to foster the students' abilities to fully utilize cutting-edge specialized knowledge in their technological and scientific fields.
2. The major offers elective subjects on Intelligent Information Systems Engineering, Mathematical Information Systems Engineering, and Precision Control Engineering. These subjects will not only promote academic research, but will also deepen the student's understanding of integrated technologies covering multiple specialized disciplines. Through discussions with their academic supervisors, students are required to plan a course of study that enables them to develop the ability to take on challenges not only in their area of specialization, but also in interdisciplinary areas, and to cultivate multifaceted thinking abilities for advanced technology and science.
3. Through research thesis guidance from each academic supervisor (or multiple academic supervisors), the major provides a curriculum that enables students to develop the abilities to realize and promote the construction and real-world applications of cutting-edge theories in new fields spanning multiple specialized disciplines. Research thesis guidance will also be provided from the perspectives of academic originality and industrial utility.
4. The subjects and research thesis guidance can be conducted in English to enable students to develop global communication skills. In addition, students will actively participate in international conferences and research internships during their period of study, thereby cultivating international sensibilities.

1. The fields of science and technology have entered a stage in which new value is created through the integration of various highly specialized disciplines. For example, it would not be possible to achieve space exploration, ocean development, or robotics based solely on the results from a single field of study.
2. Taking into account the trend described above in item (1), this major is divided into Intelligent Information Systems Engineering, Mathematical Information Systems Engineering, and Precision Control Engineering. In addition to developing computing technologies, information and communications technologies, intelligent information processing technologies, and signal processing technologies, this major aims to systematize the technologies for integrating information from these different sources. The Information Science and Control Engineering major also creates new systematized technologies by promoting the development of advanced machine mechanisms and production system control technologies through the organic combination of improvements to ultraprecise measurement control and ultraprecise processing technologies with astute decision-making and awareness.
3. As shown in the Attached Table, this major offers specialized education subjects for Intelligent Information Systems Engineering, Mathematical Information Systems Engineering, and Precision Control Engineering.
4. All lecture subjects from among those described above are elective. As these subjects are based on each individual lecturer's field of study, there is a high degree of specialization. Therefore, it is important for students to select the subjects while considering their future personal applicability. When choosing elective subjects, students are encouraged to refer to the Program Guide and to seek guidance from their academic supervisors.
5. Journal Club sessions (compulsory) are conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the sessions are jointly conducted by two or more laboratories with similar specialties.
6. The doctoral thesis will be based on the consolidated results of research conducted over the three years of the doctoral program under the guidance of the academic supervisor. Students are encouraged to present their doctoral research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 3rd Year Term 1	2	3	Lecturer-in-Charge	Notes
Compulsory	Information Science and Control Engineering 1	3	●			Staff (3 lecturers)	
	Information Science and Control Engineering 2	3		●		Staff (3 lecturers)	
	Researcher Ethics	1	●	●		Staff	Take this subject in the 1st or 2nd term after consultation with academic advisor
	Total	7					
Elective	Advanced Computer Science	2	●			Yukawa	
	Advanced Finite Element Analysis	2		●		Kurahashi	
	Nonlinear System Design	2	●			Tsubone	
	Advanced Course of Chaos and Fractals Informatics	2	●			Nambu	
	Advanced Information Circuit Engineering	2		●		Iwahashi, Harakawa	
	Advanced Nonlinear Optics	2		●		Tanaka (K), Kato & Unuma	
	Advanced Signal and Image Processing	2	●			Endo & Sugita	
	Advanced Super-precision Instrumentation	2	●			Aketagawa	
	Advanced Topics in Control Systems Engineering	2		●		Kimura (T)	S
	Feedforward Control Theory	2	●			Miyoshi	S
	Advanced Data Management	2		●		Zhang(K)	S
	Advanced Precision Machining	2	●			Isobe	
	Advanced Design of Machine Elements	2		●		Ohta	
	Advanced Machine - Environment Design Engineering	2	●			Abe (M)	S
	Informatics for Human Society and Industry	2		●		Watahiki, Suzuki(N) & Nakahira	
	Advanced Business Strategy	2	●			Ito (Y)	
	Advanced Social Informatics	2	●			Hayama, Nishiyama & Kumoi	
	Information and Mathematical Science for Engineering	2	●			Hara (S), Yamamoto (Ke) & Manada	
	Advanced Biomedical Engineering	2	●			Nomura, Akimoto, Doi & Oiwa	
	Advanced Network System	2		●		Nambu	
	Neuroimaging and Biosignal Processing	2	●			Nambu	
	Total	42					

All subjects in this table may be taken in English. Students who wish to take lectures in English should confirm this with the lecturer-in-charge when submitting the *Subject Registration Form.*

【Symbols in the Notes Column】

・Subjects marked with an "S" are offered as part of the Advanced Safety Engineering Course

Materials Science

[Diploma Policy]

Materials Science aims to nurture the development of leading engineers and researchers who have an abundance of academic knowledge in specialized fields such as Structural Material Engineering, Functional Material Engineering, and Intelligent Device Engineering; can utilize information technology; and possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and advanced expertise.

To this end, Materials Science has set the following five attainment targets to enable students to acquire a broad education through class subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced research abilities needed to independently conduct research, as well as in-depth scholastic knowledge from subjects in the specialized fields of Structural Material Engineering, Functional Material Engineering, and Intelligent Device Engineering that forms the foundation of such research.
2. Acquisition of a broad educational ability to comprehend life, humanity, and society from the perspectives of technology and science; the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; as well as multifaceted and flexible thinking abilities for advanced technology and science.
3. Formation of the ability to advance academic research based on high ethical standards, as well as the practical and creative abilities with an active willingness to continue developing these research findings until they are actualized as new technologies.
4. Formation of international sensibilities and communication skills balanced with advanced research and technical abilities, as well as global leadership abilities that can lead industries in Japan and the rest of the world.
5. Formation of the ability to effectively communicate one’s area of research not only to researchers in specialized fields, but also to the general public.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through subjects offered by Materials Science to facilitate the acquisition of the above targets, and have passed the thesis review based on the doctoral thesis review standards.

[Curriculum Policy]

Materials Science has set the following Curriculum Policy items in accordance with the Curriculum Policy of Nagaoka University of Technology's Doctoral Program. Please refer to the Program Guide for information on subject offerings.

1. Two compulsory subjects (Materials Science 1 and 2) are offered by all academic staff members and conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the seminars are jointly conducted by two or more laboratories with similar specialties.
2. The major offers elective subjects on Structural Material Engineering, Functional Material Engineering, and Intelligent Device Engineering. As these subjects are based on each individual lecturer's expertise, there is a high degree of specialization. Students should select the subjects in consideration of their future. These subjects will foster the acquisition of a broad educational ability to comprehend aspects of life, humanity, and society; the ability to explore new fields through integrated technologies covering multiple specialized disciplines; and multifaceted and flexible thinking abilities for advanced technology and science.
3. Through research thesis guidance from each academic supervisor (or multiple academic supervisors), the major provides a curriculum that enables students to develop the abilities to carry out research and development related to the design, control, creation, analysis, and evaluation of substances, materials, components, and devices with the aim of developing new structural materials, high-performance/highly functional materials, and high-performance intelligent devices that meet the diverse needs of various science and technology fields. Research thesis guidance will also be provided from the perspectives of academic originality and industrial utility.
4. The subjects and research thesis guidance can be conducted in English to enable students to develop global communication skills. In addition, students will actively participate in international conferences and research internships during their period of study, thereby cultivating international sensibilities.

1. At present, the application conditions for materials have become highly complex and stringent. There is also an immense variety of materials available, such as metallic materials, inorganic materials, organic materials, and composite materials manufactured by combining and integrating different materials. Furthermore, recent material design has reached the quantum level, which takes into account the behavior of molecules and atoms. The development of new materials can be considered the cornerstone of technological innovation, and is critically important for the promotion of creative and independent technological advancements.

2. This major focuses on conducting research on the development of novel structural materials a nd high-performance/high-function materials that meet the diverse needs of various science and t echnology fields. Research is also conducted on the analysis and assessments of material reliabil ity for the design and manufacture of components and structures.

3. As shown in the Attached Table, this major offers specialized education subjects for Structur al Material Engineering, Functional Material Engineering, and Material Reliability Engineering.

4. All lecture subjects from among those described above are elective. As these subjects are based on each individual lecturer's field of study, there is a high degree of specialization. Therefore, it is important for students to select the subjects while considering their future personal applicability. When choosing elective subjects, students are encouraged to refer to the Program Guide and to seek guidance from their academic supervisors.

5. Journal club sessions (compulsory) are conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the sessions are jointly conducted by two or more laboratories with similar specialties.

6. The doctoral thesis will be based on the consolidated results of research conducted over the t hree years of the doctoral program under the guidance of the academic supervisor. Students are e ncouraged to present their doctoral research content at scientific meetings and conferences in thei r field of study while they are enrolled at NUT.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 3rd Year Term 1	Term 2	Term 3	Lecturer-in-Charge	Notes
Compulsory	Materials Science 1	3	●			Staff (3 lecturers)	
	Materials Science 2	3		●		Staff (3 lecturers)	
	Researcher Ethics	1	●	●		Staff	Take this subject in the 1st or 2nd term after consultation with academic advisor
	Total	7					
Elective	Creation of Advanced Materials	2	●			Nanko	
	Advanced Course of Nondestructive Materials Characterization	2	●			Ihara	
	Advanced Diffraction Physics	2		●		Homma (To)	O
	Advanced Course of Inorganic Structural Materials Science	2		●		Tanaka (S)	
	Advanced Course of Precise Molecular Design 1	2	●			Takenaka	
	Advanced Course of Precise Molecular Design 2	2	●			Maekawa	
	Advanced Organic Functional Materials Science	2		●		Kawahara	
	Advanced Organic Solid State Chemistry	2		●		Imakubo	
	Advanced Course for Functional Materials Science	2	●			Matsubara	
	Advanced Physical Characteristics of Materials	2		●		Saitoh(H)	
	Advanced Optical Device Engineering	2		●		Kimura (M)	
	Advanced Electroceramics	2		●		Okamoto (T)	
	Advanced Course for Fracture Control	2		●		Miyashita (Y)	
	System Design for Structural Safety	2		●		Otsuka (Y)	S
	Advanced Engineering for Sustainable Environmental Materials	2		●		Takahashi(Y)	
	Advanced Engineering on Functional Inorganic Materials	2	●			Ishibashi & Nishikawa	
	Advanced Manufacturing DX System	2	●			Nakayama	
	Advanced Control Engineering for Electromagnetic and Optical Waves	2		●		Ono, Tamayama & Sasaki(T)	
	Advanced Molecualr Robotics	2		●		Shoji	
	Advanced Course for Crystal Engineering	2		●		Aida	
	Advanced materials informatics	2	●			Yamashita(To)	
	Advanced Laser Processing	2		●		Mizoshiri	
	Total	44					

All subjects in this table may be taken in English. Students who wish to take lectures in English should confirm this with the lecturer-in-charge when submitting the *Subject Registration Form.*

【Symbols in the Notes Column】

E : Conducted during even-numbered years according to the Reiwa Calendar

O : Conducted during odd-numbered years according to the Reiwa Calendar

・ Subjects marked with an "S" are offered as part of the Advanced Safety Engineering Course

Civil Engineering and Bioengineering

[Diploma Policy]

Civil Engineering and Bioengineering aims to nurture the development of leading engineers and researchers who have an abundance of academic knowledge in specialized fields such as Civil Infrastructure and Disaster Resilience System Engineering, Environmental Management Engineering, and Environmental and Biological Engineering; can utilize information technology; and possess advanced practical and creative abilities that can facilitate the global expansion of technology, the ability to create new knowledge and technologies, as well as original and advanced expertise.

To this end, Civil Engineering and Bioengineering has set the following five attainment targets to enable students to acquire a broad education through class subjects, research guidance, and extracurricular activities both inside and outside the university.

1. Acquisition of the advanced research abilities needed to independently conduct research, as well as in-depth scholastic knowledge from the specialized fields of Civil Infrastructure and Disaster Resilience System Engineering, Environmental Management Engineering, and Environmental and Biological Engineering that forms the foundation of such research.
2. Formation of high ethical standards in conducting research and the acquisition of strong research leadership skills based on those standards.
3. Acquisition of a broad educational ability to comprehend life, humanity, and society from the perspectives of science and technology; the ability to explore new fields based on an understanding of integrated technologies covering multiple specialized disciplines; multifaceted and flexible thinking abilities for advanced technology and science; as well as the practical and creative abilities with an active willingness to continue developing research findings until they are actualized as new technologies.
4. Formation of international sensibilities and communication skills balanced with advanced research and technical abilities, as well as global leadership abilities that can lead industries in Japan and the rest of the world.
5. Formation of the ability to effectively communicate one’s area of research not only to researchers in specialized fields, but also to the general public.

A doctoral degree will be conferred on students who have acquired the number of credits necessary for completion through subjects offered by Civil Engineering and Bioengineering to facilitate the acquisition of the above targets, and have passed the thesis review based on the doctoral thesis review standards.

[Curriculum Policy]

Civil Engineering and Bioengineering has set the following Curriculum Policy items in accordance with the Curriculum Policy of Nagaoka University of Technology's Doctoral Program. Please refer to the Program Guide for information on subject offerings.

1. Two compulsory subjects (Civil, Environmental, and Biological Engineering 1 and 2) are offered by all academic staff members to foster the students' abilities to fully utilize cutting-edge specialized knowledge in their technological and scientific fields.
2. The major offers elective subjects in the three fields of Civil Infrastructure and Disaster Resilience System Engineering, Environmental Management Engineering, and Environmental and Biological Engineering, which aim to equip students with cutting-edge technical skills (technical competence) to solve problems in civil engineering and bioengineering, as well as cutting-edge scientific knowledge (scientific competence) that provides scientific insight into the results of research.
3. The offered subjects are designed not only to promote the students' academic research in their specialized fields, but also to deepen their understanding of integrated technologies covering multiple specialized disciplines. Students will plan a course of study under guidance from their academic supervisors, and the major offers a curriculum that enables the creation of new and original technologies and science (GIGAKU) by providing students with the ability to take on challenges not only in their area of specialization, but also in interdisciplinary areas, and to cultivate multifaceted thinking abilities for advanced technology and science.
4. Through doctoral thesis research guidance from the academic supervisors (main supervisor and co-supervisors), students will be guided to develop the abilities to realize and promote the construction and real-world applications of cutting-edge theories in new fields spanning multiple specialized disciplines.
5. The subjects and research thesis guidance can be conducted in English, thereby allowing students to develop global communication skills. In addition, students will actively participate in international conferences and research internships during their period of study, thereby cultivating international sensibilities.
6. The subjects and research thesis guidance in the education and research fields of Civil Engineering and Bioengineering incorporate processes to foster high ethical standards from the perspective of research ethics that are crucial to the fields of civil engineering and bioengineering.

1. Scientific and technological progress has enabled humanity to build advanced civilizations through industrialization. However, the continuous development of technologies that overemphasize humanity's convenience has greatly impacted society's safety and environmental sustainability. There are many problems arising from the discordance between nature and human society as a whole, such as the occurrence of increasingly catastrophic natural disasters, worsening of living environments and public health in massive cities, as well as environmental destruction and the loss of biodiversity at the global level. To solve these problems, it is necessary to build societies that are sustainable. Accordingly, there is an unprecedented increase in society's demands for the establishment of technologies to maintain civil infrastructure, advanced disaster resilience and mitigation technologies, environmentally friendly technologies, energy conservation and resource circulation technologies, and safe and secure living infrastructure technologies.

2. In order to resolve the aforementioned problems faced by society, this major is divided into three fields: Civil Infrastructure and Disaster Resilience System Engineering, Environmental Management Engineering, and Environmental and Biological Engineering. Herein, we conduct research and education on the development of technologies that can be applied to the improvement of social living through environmental conservation, health care, and welfare. These technologies include the construction and maintenance of sustainable civil infrastructure systems equipped with advanced disaster resilience and mitigation technologies, situation-specific environmental cleanup systems and their operating technologies, and functions derived from living organisms or biomolecules.

3. As shown in the Attached Table, this major offers specialized education subjects on Civil Infrastructure and Disaster Resilience System Engineering, Environmental Management Engineering, and Environmental and Biological Engineering.

4. All lecture subjects from among those described above are elective. As these subjects are based on each individual lecturer's field of study, there is a high degree of specialization. Therefore, it is important for students to select the subjects while considering their future personal applicability. When choosing elective subjects, students are encouraged to refer to the Program Guide and to seek guidance from their academic supervisors.

5. Journal Club sessions (compulsory) are conducted in the research laboratory of each student's academic supervisor. However, there may be cases where the sessions are jointly conducted by two or more laboratories with similar specialties.

6. The doctoral thesis will be based on the consolidated results of research conducted over the three years of the doctoral program under the guidance of the academic supervisor. Students are encouraged to present their doctoral research content at scientific meetings and conferences in their field of study while they are enrolled at NUT.

7. This major includes subjects offered by the Safety Engineering Course. Students enrolled in this course must earn 6 credits or more from subjects marked with an "S" in the course's Attached Table.

Attached Table (Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 3rd Year Term			Lecturer-in-Charge	Notes
			1	2	3		
Compulsory	Civil, Environmental, and Biological Engineering 1	3	●			Staff (3 lecturers)	
	Civil, Environmental, and Biological Engineering 2	3		●		Staff (3 lecturers)	
	Researcher Ethics	1	●	●		Staff	Take this subject in the 1st or 2nd term after consultation with academic advisor
	Total	7					
Elective	Advanced Lecture on Disaster Control and Revitalization	2	●			Kamimura(S)	S
	Advanced Hybrid Materials and Structures	2	●			Shimomura & Fukumoto	
	Advanced Estimation of Materials Life-time or Remaining Life-time	2		●		Takahashi (O)	
	Advanced steel structural engineering	2		●		Iwasaki	
	Advanced Urban Transportation Planning	2		●		Sano	
	Advanced Urban and Regional Planning	2		●		Matsukawa	
	Advanced Hydrospheric Engineering	2	●			Lu, Hosoyamada, Kumakura & Inukai	
	Advanced Environmental Engineering	2		●		Komatsu(T), Yamaguchi, Himeno & Maki	
	Applied numerical methods for geotechnical engineering	2	●			Ohtsuka (S) & Fukumoto	
	Advanced Course of Disaster Management	2	●			Ikeda	
	Advanced Geotechnical Engineering	2		●		Toyota	
	Advanced Engineering for Global Environmental Measurement	2		●		Takahashi (K)	
	Advanced Course of Biomaterial Engineering	2	●			Kuwabara	
	Advanced Course of Plant Genetic Engineering	2	●			Nishimura	
	Advanced Stem Cell Technology	2	●			Ohnuma	
	Advanced Course of Applied Microbial Technology	2		●		Masai	
	Integrated Plant Biotechnology	2		●		Takahara	
	Advanced Course of Environmental and Applied Biochemistry	2		●		Takahashi (S)	
	Advanced Course of Engineering for Wildlife Management	2	●			Yamamoto (M)	
	Advanced Course of Glycobiology and Glycotechnology	2		●		Sato (T)	
	Ion channels and Excitable Membrane	2		●		Takimoto	
	Biorefinery Development	2		●		Ogasawara	
	Molecular Neuroengineering	2		●		Shimoda	
	Genetic Engineering - Advanced Course	2		●		Kasai	
	Biological systems in molecular motility	2	●			Fujiwara	
	Advanced Course of Microbiology for Environmental Engineering	2	●			Hatamoto	
	Total	52					

All subjects in this table may be taken in English. Students who wish to take lectures in English should confirm this with the lecturer-in-charge when submitting the *Subject Registration Form.*

【Symbols in the Notes Column】

・ Subjects marked with an "S" are offered as part of the Advanced Safety Engineering Course

Advanced Course for Strategic Engineer Promotion

**This course is for students who have been registered since their enrollment in a technical college.*

Advanced Course for Strategic Engineer Promotion with Technical College Collaboration

1. Overview

1) Objectives and Goals

This course was established through collaborative efforts between Nagaoka University of Technology (NUT) and Japan's technical colleges with the aim of nurturing the development of "strategic engineers", i.e., individuals who can bring about social change by pioneering new global and social outlooks. The course is designed as a continuous course beginning from 4th-year students in Japan's technical colleges to the master's program at NUT.

In recent years, the following global trends have become more prominent:

- Technological developments required for the integration of different specialized fields
- Increasingly diverse and complex economies and societies
- Rapid internationalization of industries

Technical colleges possess a unique characteristic in that its students receive an early engineering education in a practical environment. By utilizing this characteristic, this course aims to maximize the exceptional education process linking technical colleges and NUT in order to train strategic engineers unafraid to take on new challenges and bring about social change through innovations in the world, society, and people by creating and spreading new technology-based values under the global trends described above.

Course students will begin taking the course subjects while still enrolled in technical colleges, and aim to matriculate to and graduate from NUT's undergraduate and master's programs in the same way as other NUT students. In addition, the students will aim to take all required course subjects and successfully complete the course.

2) Cultivation of Three Key Qualities

Since its founding, NUT has endeavored to develop leading engineers with practical and creative capabilities. Through the implementation of an integrated education program between Japan's technical colleges and NUT, our university has produced many highly qualified engineers that support Japan's "*monozukuri*" (the art, science, and craft of the unique Japanese approach to craftsmanship and manufacturing) culture and fulfill the needs of an industrialized society.

This course aims to produce strategic engineers that surpass the conventional image of engineers educated at NUT by cultivating the following qualities: multifaceted and flexible thinking ability, strategic technological development ability, and internationally applicable leadership ability:

◆Multifaceted and flexible thinking ability: The development of science and technology in increasingly complex and large-scale industries requires the integrated practical implementation of technology. In order to enable creative technological development, individuals require a multifaceted and flexible thinking ability acquired from other disciplines.

◆Strategic technological development ability: For individuals seeking to bring about social change (strategic engineers) and challenge the various common problems faced by humanity, the ability to develop new technologies is inadequate by itself. Consideration must also be given as to how to propose new values to help bring about a truly happy human society. Therefore, individuals require the ability to strategically develop new technologies by comprehensively considering all facets of the process, including fundamental technological development, production and marketing, global economies, and the consumers who will receive these products and services.

◆Internationally applicable leadership ability: The globalization of industrial activities has brought about the need for effective

international communication. In order to develop and advance projects in this environment, individuals must not only possess linguistic abilities, but must also have the ability to fully expand upon their own thinking and take on the challenge of leadership in the face of various personality types.

In order to cultivate these 3 qualities, the course has designated specific subjects at each stage of the education process from technical college to NUT based on the existing integrated education program between these institutions.

3) Characteristics and Approach

This course is a 6-year program, beginning in the 4th-year of technical college and progressing until completion of the master's program. The study period is divided into 3 distinct stages with the following objectives.

・Stage 1 (Technical College: 4th-5th years): Students will gain practical experience in industrial activities and cutting-edge research and development; they will also formulate a clearer image of the type of engineer that they aspire to be and increase their motivation.

・Stage 2 (NUT Undergraduate Program: 3rd-4th years): Students will actively gain knowledge from disciplines outside their own field, and acquire abilities such as logical thinking to further establish their foundation as engineers.

・Stage 3 (NUT Master's Program: 1st-2nd years): Students will conduct various activities based on what they have learned so far, become more aware of their strengths and shortcomings, and clearly define their future goals.

At each stage, the course offers subjects to increase knowledge in a wide range of engineering-related fields, build the foundation for strategic characteristics for technological development (including technology management), and facilitate the acquisition of internationally applicable knowledge.

2. Course Outline

1) Subject Requirements

・Stage 1 (Technical College: 4th-5th years)

Students must earn 2 credits or more from the Introductory Subjects. Credits earned from the Introductory Subjects will not be counted toward graduation from technical colleges. However, students who have transferred to NUT can apply for these subjects to be recognized as credits under NUT's subject classification described below. (Please refer to the Page of the Course Guide for "Agreement for the Administration of Academic Credits and Academic Achievements from Other Universities and Non-University Educational Institutions").

Introductory Subjects	Corresponding Subject Classification at NUT	
Intensive Seminar, Intensive Practices in Laboratory, Advanced Laboratory Exercise	Mechanical Engineering	General Elective Subjects: "Intensive Seminar", "Intensive Practices in Laboratory", "Advanced Laboratory Exercise"
	Electrical, Electronics and Information Engineering	Elective Subjects: "Introductory Seminar in Electrical, Electronics and Information Engineering", "Introductory Laboratory Exercise in Electrical, Electronics and Information Engineering", "Advanced Laboratory Exercise"
	Materials Science and Technology	Tertiary Elective Subjects: "Intensive Seminar on Materials", "Intensive Practices in Materials Laboratory", "Advanced Laboratory Exercise"
	Civil and Environmental Engineering	Tertiary Elective Subjects: "Intensive Seminar", "Intensive Practices in Laboratory", "Advanced Laboratory Exercise"
	Bioengineering	Elective Subjects: "Seminar for Advanced Course"; "Laboratory Exercise for Advanced Course", "Advanced Laboratory Exercise"
	Information and Management Systems Engineering	Elective Subjects Group II: "Intensive Seminar", "Intensive Practices in Laboratory", "Advanced Laboratory Exercise"
Advanced Technology Lecture, Advanced Technology Practices, Basic Practice to Innovative Engineer	General Studies: Interdisciplinary Subjects "Advanced Technology Lecture"; "Advanced Technology Practices", "Basic Practice to Innovative Engineer"	
International Conference Presentation	Foreign Languages: (English: Introduction to Academic Presentation) * *After transfer admission to NUT, students must pass a placement test to earn these credits.	

Collaborative Subjects 1 are offered as part of this course in the technical colleges, and will not be accepted as credits at NUT. There are 3 Collaborative Subjects: "Introduction to Technological Frontiers", "Basic English Presentation", and "Introduction to Technology-Supporting Mathematics". However, the detailed subjects, content, and structure of the lectures vary among the individual technical colleges.

・Stage 2 (NUT Undergraduate Program: 3rd-4th years)

Subjects are organized into Specialized Subjects, Engineer Competency Subjects, and International Human Qualities Subjects.

Specialized Subjects include "Second Lab 1", "Engineer Competency Exercise 1", and "Engineer Competency Exercise 2". All these subjects are compulsory, but will not be counted as credits for graduation. For the Engineer Competency Subjects and International Human Qualities Subjects, the subjects are grouped by compiling several NUT General Studies subjects according to the objectives of this course. Course students must acquire the necessary credits from these subject groups as shown in the course curriculum table.

Please note that "Engineering Ethics" is a compulsory subject required for graduation from the undergraduate program.

・Stage 3 (NUT Master's Program: 1st-2nd years):

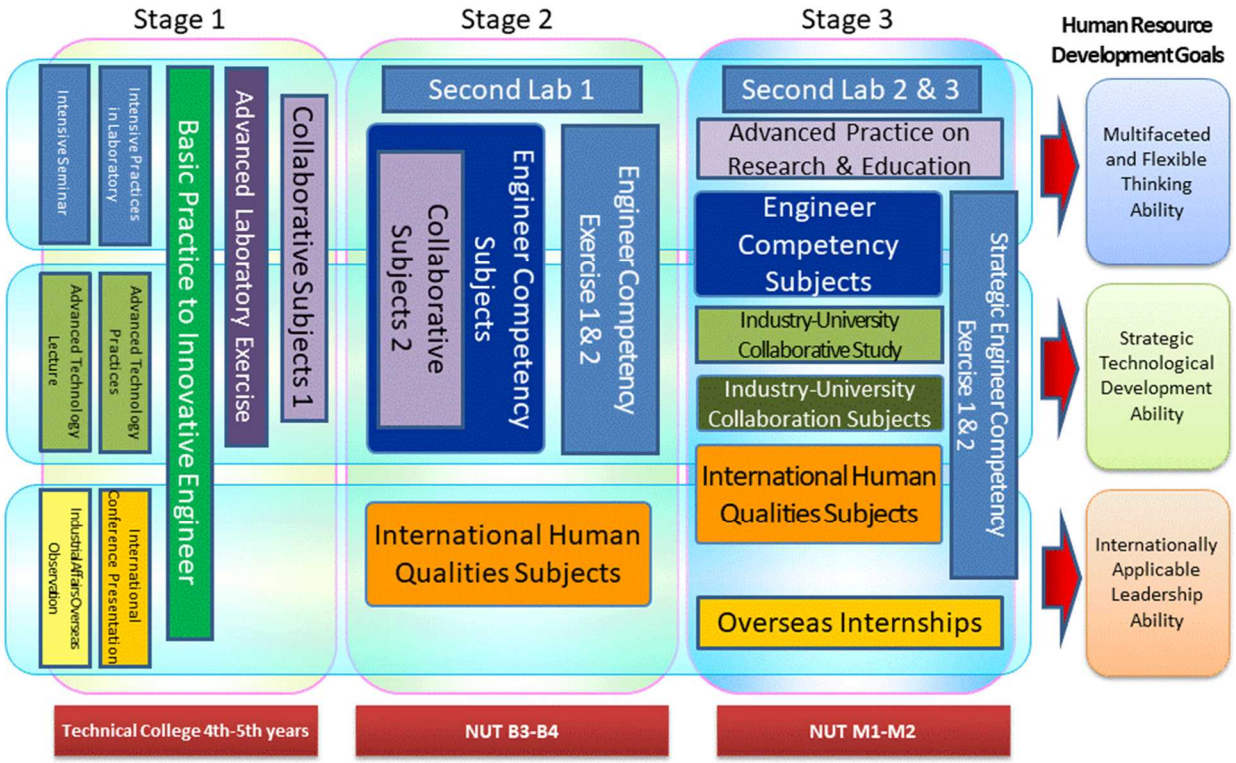
Subjects are organized as Specialized Subjects, Engineer Competency Subjects, International Human Qualities Subjects, and Industry-University Collaboration Subjects.

Among the Specialized Subjects, compulsory subjects include "Second Lab 2", "Strategic Engineer Competency Exercise 1", and "Strategic Engineer Competency Exercise 2"; elective-compulsory subjects include "Industry-University Collaborative Study", "Advanced Practice on Research & Education", and "Overseas Internships". All these subjects are compulsory, but will not be counted as credits for graduation. The other subjects are grouped by compiling several existing subjects according to the objectives of this course. Course students must acquire the necessary credits from these subject groups as shown in the course curriculum table.

2) Course Completion

The prerequisites for graduating from the undergraduate program and completing the master's program are determined by the respective programs where each student is enrolled. The completion of this course requires that students earn the necessary credits as shown in the course curriculum table. Students who fulfill the prerequisites for completing the course and the master's program will be awarded a certificate of course completion in addition to the master's degree.

◆Subject Organizational Diagram◆



Advanced Course for Strategic Engineer Promotion - Curriculum Table (For AY 2024 Enrollees)

Classification		Compulsory/Elective	Subject Name	Credits	Technical College 4th~5th Year Term 1	2	3	Undergraduate 3rd~4th Year Term 1	2	3	Master's 1st~2nd Year Term 1	2	3	Lecturer-in-Charge	Notes	Course Completion Conditions
Stage 1	Introductory	Elective-Compulsory	Advanced Laboratory Exercise	2	2									Nanko & Others	Recommended for 5th-Year Technical College Students	Earn 2 credit or more from 'Introductory'. Collaborative 1 Subjects are offered as part of this course in the technical colleges, and will not be accepted as credits at NUT.
			Basic Practice to Innovative Engineer	2		2								Nanko & Others	Recommended for 4th-Year Technical College Students	
			Intensive Seminar	1	1										used to be offerred until AY 2015	
			Intensive Practices in Laboratory	1	1											
			Advanced Technology Lecture	1	1											
			Advanced Technology Practices	1	1											
			International Conference Presentation	1		1										
			Total	9												
	Collaborative 1	Elective	Introduction to Technological Frontiers		Offered as Technical College Subjects									Yamaguchi & Others	Fukushima, Oyama, Nagaoka, Kagawa	
			Basic English Presentation											Nanko & Others	Tsuruoka, Nagaoka, Nagano, Fukui	
			Introduction to Technology-Supporting Mathematics											Iwasaki & Others	Tomakomai, Fukui	
			Total													
Stage 2	Specialized	Compulsory	Second Lab 1	[1]				[1]						Nanko & Others		Earn all the 3 credits
			Engineer Competency Exercise 1	[1]				[1]						Nanko & Others	5th Period, Friday	
			Engineer Competency Exercise 2	[1]					[1]					Nanko & Others	5th Period, Friday	
			Total	[3]												
	Engineer Competency		Engineering Ethics	2				2						Shigeta & Others		
			Local Industry and Globalization	2				2						Yamaguchi & Others	Collaborative Subject 2	Earn 4 credits or more
			Information Technology and Social Evolution	2					2					Yukawa		
			Earth Environment and Technology	2					2					Inukai & Others		
			Logic and Thought	2					2					Shigeta		
			Management Engineering	2				2						※ Katayama		
			Japanese Technical Writing	2				2	2					Wakabayashi	Same lectures conducted in Terms 1 and 2	
			Technology Development and Intellectual Property Right	2				2						※ Miyata		
			Macro Economics	2				2						※ Ohta		
			Working Adults Necessity Learned from Education Within Enterprise	1				1						Shionoya & Others	In collaboration with ANA and Daishi Bank	
			Total	19												
Stage 2	International Human Qualities	Elective	Global Communication	2				2						Lee-Iizuka & Others		Earn 2 credits or more
			Japanese Philosophical Development	2					2					Wakabayashi		
			Japanese Modernization and Western Civilization	2					2					※ Inagaki		
			Total	6												

Classification		Compulsory/Elective	Subject Name	Credits	Technical College 4th~5th Year Term			Undergraduate 3rd~4th Year Term			Master's 1st~2nd Year Term			Lecturer-in-Charge	Notes	Course Completion Conditions
					1	2	3	1	2	3	1	2	3			
Stage 3	Specialized	Compulsory	Second Lab 2	[1]								[1]		Nanko & Others		Earn all the 3 credits
			Strategic Engineer Competency Exercise 1	[1]							[1]			Nanko & Others		
			Strategic Engineer Competency Exercise 2	[1]								[1]		Nanko & Others		
			Total	[3]												
		Elective-Compulsory	Second Lab 3	[1]								[1]		Nanko & Others		Earn 1 credit or more (Compulsory attendance for advance training and results reporting sessions)
			Advanced Practice on Research & Education	[1]								[1]		Shigeta & Takahashi (Kazuyoshi)		
			Overseas Internships	[1]								[1]		Shigeta & Takahashi (Kazuyoshi)		
			Industry-University Collaborative Study	[1]								[1]		Shigeta & Takahashi (Kazuyoshi)		
			Total	[4]												
	Engineer Competency	Elective	Gigaku Innovation and Creativity	2							2			Manada	Classes conducted in English	Earn 4 credits or more
			Total	2												
	International Human Qualities		Compliance of Corporation	2							2			※ Suenaga		
			Japanese Industrial Development and SDGs	2								2		Katsumi	Classes conducted in English	
			English For Academic Purposes	2							2			※Takahashi (A)	Classes conducted in both English and Japanese	
			Total	6												
	Industry-University		Energy and Economy in Japan	2							2			Li & ※ Itoh (K)		
			An outline of Intellectual Property	2							2			※ Yoshii		
			Total	4												

Note 1. First Term: April 1 to August 31
Second Term: September 1 to December 31
Third Term: January 1 to March 31

Note 2. [1] indicates credits that do not count toward program graduation/completion

Note 3. ※ in the "Lecturer-in-Charge" column indicates an adjunct lecturer

Nuclear System Safety Regulatory Course

(Course for All Master's Programs, including the Nuclear Technology)

Nuclear System Safety Regulatory Course
(Course for All Master's Programs, including the Nuclear Technology)

1. Overview

This postgraduate-level course is designed to train practical engineers with an overall understanding of system safety that incorporates knowledge of nuclear power and other disciplines, and also have a practical understanding of nuclear power plants' regulatory systems from an engineer's perspective and the ability to further improve safety.

Building on the foundation of knowledge in students from the Nuclear Technology, this course aims to nurture the development of individuals who can take a comprehensive view of nuclear power regulatory systems from an engineer's perspective, and possess the technical expertise to solve safety-related issues in nuclear systems.

Nuclear systems involve the comprehensive and integrated application of various fields, including mechanical engineering, electrical engineering, civil engineering, and materials science. Therefore, this course would also be beneficial for students who are not enrolled in the Nuclear Technology, as the systematic acquisition of knowledge that can contribute to improving nuclear system safety combined with their own specialized expertise will support the development of practical engineers who can play critical roles in safety improvement.

2. Course Outline

① Subject Requirements

Students from all master's programs may take this course. Students who wish to enroll must take the Specialized Engineering subjects (Refer to the course curriculum table in Table 1) offered by the Nuclear Technology.

② Course Application

Students who wish to take this course must submit the *Application Form for the Nuclear System Safety Regulatory Course* to the Division of Academic Affairs (scheduled for the first subject registration period in the first and second terms).

③ Course Completion

The completion of this course requires that students earn the necessary credits from the subjects listed in the course curriculum table (Table 1). Students who fulfill the prerequisites for completing the course and the master's program will be conferred a certificate of course completion in addition to the master's degree.

Table 1. Nuclear System Safety Regulatory Course Curriculum Table

Course Completion Requirements	Compulsory/Elective	Subject Names	Credits	First to Second Years			Notes
				Term			
				1	2	3	
Acquire ≥6 credits, including those from the compulsory subject	Compulsory	Advanced Lecture on Nuclear Regulation	2	2			★
	Elective	Advanced Engineering for Radiation Safety and Detection	1	1			★
		Advanced Lecture on Nuclear and Radiochemistry	2	2			★
		Nuclear Reactor Design	2		2		★
		Nuclear Power Reactor and Plant Systems	2	2			
		Basics of Nuclear Technology	2	2			★
		Environmental Radioactivity and Biological Impact	2		2		★
		Advanced Safety and Crisis Management	2	2			
		Nuclear Emergency Planning and Resilience Engineering	2		2		
		Advanced Seismic Safety Engineering and Community Disaster Management	2		2		★

Students not enrolled in the Nuclear Technology may take the above subjects if offered by other departments. However, students must consult with their academic supervisors and register graduate-level subject offered in other majors. Then the students must obtain approval from their academic supervisor if they wish to have these subject(s) counted as master's program completion requirements.

[Symbols in the Notes Column]

★: Conducted in both English and Japanese

Ministry of Education, Culture, Sports, Science and Technology
Doctoral Program for World-leading Innovative & Smart Education (WISE Program)

Global Pro-Active Root Technology Program

(Course for the 5-year Integrated Doctoral Program)

Doctoral Program for World-leading Innovative & Smart Education (WISE Program)
(Program for the Science of Technology Innovation)
WISE Global Pro-Active Root Technology Program

1. Overview and Objective

The Doctoral Program for World-leading Innovative & Smart Education (WISE Program) was established by the Ministry of Education, Culture, Sports, Science and Technology with the aim of leading the production and application of new knowledge, as well as the creation of value to drive the next generation. The program will develop a pool of doctoral talent (high-level knowledge professionals) that will undertake the challenges of solving society's problems and bringing about social innovation.

The WISE Global Pro-Active Root Technology Program aims to coordinate with industrial and overseas collaborative hubs, and nurture the development of professionals with expertise in "root technology". This technology forms the backbone of all industries and is centered on materials science and electrical power engineering (specifically, control engineering and power electronics), and will contribute to the attainment of Sustainable Development Goals (SDGs).

The program comprises three courses: the "Sustainable Mobility Course (Automotive, Railway, and Aviation Industries)", the "Smart Factory Course (Manufacturing Technology and Materials Processing Industries)" and the "Clean Manufacturing Course (Environmental, Energy, and Labor-Saving Production Industries)". Each student will receive a specialized education from his or her selected course. In addition, the students will also acquire the following four abilities by taking practical subjects: "Ability to explore new academic fields" for their specific field of study in which they are authorities as doctorate holders; "cutting-edge IT skills" that are not superficial, but will instead enable consistent progress; "progressive human qualities" that allow the creation of diverse human resource networks while pioneering new fields; and "practical capability to achieve social implementation" that facilitates the proposal of projects and solution of problems in industry.

2. Program Outline

Students enrolled in this program will take the compulsory subjects and elective-compulsory subjects presented in Attached Table 1.

The common study subjects and elective subjects are presented in the attached table of the Department of Science of Technology Innovation's course curriculum.

3. Requirements for Program Completion Certification

In order to receive a certificate of program completion, students must fulfill the requirements specified by the Department of Science of Technology Innovation, and also take the compulsory and elective-compulsory subjects specified by this program.

The doctoral thesis screening process for this program will not only include standard thesis screening, but will also involve the advancement qualification screening and thesis screening held every academic year for the WISE Program.

Students who successfully fulfill the prerequisites for program completion and complete the 5-year integrated doctoral program will be conferred a degree certificate that indicates completion of this program.

[Reference]

Required Credits for Program Students			Required Credits for Completion in the Department of Science of Technology Innovation
Compulsory	24	Of these, 5 credits must be earned from elective-compulsory subjects from the Department of Science of Technology Innovation	18
Elective-Compulsory	3		6
Elective	14		12
Common Study	6		6
Total	47		42

4. Important Note for Third-Year Transfer Students

Third-Year Transfer Students in Science of Technology Innovation must earn the required number of credits after deducting the number of credits (considered to have obtained) indicated in "5. Third-Year Transfer Students" on page 9 from the required number of credits (compulsory, Elective-Compulsory, Elective and Common Study) indicated on the table in section of "3. Requirements for Program Completion Certification". Students are not able to take the subject considered to have taken which are indicated on Attached Table 1, as well as subjects indicated on Attached Table of Science of Technology Innovation on page 11 to 13.

Please consult with Chair of Science of Technology Innovation immediately if students have any questions about taking subjects.

WISE Program Subject Requirements

Students enrolled in the WISE Program must take the program's compulsory subjects and elective-compulsory subjects specified in Sections (1) and (2) below. (Refer also to Attached Table 1)

(1) Compulsory Subjects
· Practical Work for Project Leader Education 3 credits (Elective-compulsory subject in the Science of Technology Innovation)
· Researcher Ethics 2 credits (Elective-compulsory subject in the Department of Science of Technology Innovation)
· Advanced Practical Work for Project Leader Education 1 credit
· Advanced International Research Internship 1 credit
· ICT Practicum 1 credit
The following compulsory subject in the Department of Science of Technology Innovation should be taken by WISE Program students in their first or second years. However, changes may occur according to schedule adjustments with the collaborative organizations and the progress status of research/projects.
· International Research Internship 4 credits

(2) Elective-Compulsory Subjects
Students must earn a minimum of 3 credits from the elective-compulsory subjects listed in Attached Table 1.
Students must take either or both of the following subjects:
· International Root Technologies School 1 credit
· Advanced Root Technologies 1 credit

○ Attached Table 1 (Applicable to students who matriculate in AY 2024)

Compulsory/ Elective	Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Compulsory	Practical Work for Project Leader Education	3	1・2①～③	Staff	Taking this subject is considered as taking an elective-compulsory subject in the Department of Science of Technology Innovation. ☆ ※
	Researcher Ethics Ⅰ	1	1・2②	Yamada (N), Ogasawara, Itoh & Nakayama	☆
	Researcher Ethics Ⅱ	1	1～5①～③	Staff	☆
	Advanced Practical Work for Project Leader Education	1	3～5①～③	Staff	Students who have taken Practical Work for Project Leader Education (3 credits) may take this subject ☆ ※
	Advanced International Research Internship	1	3～5①～③	Staff	Students who have taken International Research Internship (4 credits) may take this subject ☆ ※
	ICT Practicum	1	1～3①～③	Staff	☆ ※
Elective-Compulsory	Advanced Science of Technology Innovation Engineering	2	1・2①～②	Nakayama, Ninomiya & ※Hanada	Recommended subject for the WISE Program ☆
	Practical Work on Venture Flotation Training Ⅰ	2	1・2①～③	Katagawa, Yamaguchi, Suzuki (N) & ( )	Recommended subject for the WISE Program ☆ Will not hinder the taking of GD3-5
	Practical Work on Venture Flotation Training Ⅱ	1	1～5①～③	Katagawa, Yamaguchi & Suzuki (N)	Recommended subject for the WISE Program ☆
	Facilitation Engineering on Science of Technology	2	1～5②	Yamaguchi, Maki, ※Ichitsubo & Others	Recommended subject for the WISE Program ○ ☆
	Plan Drafting Method for Science of Technology	1	1～5①～③	Staff	Recommended subject for the WISE Program ☆
	Innovation Case Study	2	1～5①～③	Staff	Recommended subject for the WISE Program ☆
	Practical Work on Research Guidance	2	1～5①～③	Staff	Recommended subject for the WISE Program ☆
	International Root Technologies School	1	1～5①～③	Staff	☆ Students must take either or both International Root Technologies School and Advanced Root Technologies
	Advanced Root Technologies	1	1～5①～③	Nakayama	☆ Students must take either or both International Root Technologies School and Advanced Root Technologies

Compulsory/ Elective	Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Elective-Compulsory	Business Communication	2	1～5②	Sasaki (Toru), ※Cristian & ※Ohishi	Recommended subject for the WISE Program ☆
	Creative Leadership	2	1～5②	Sasaki (Toru), ※Ohishi & ※Tajiri	Recommended subject for the WISE Program ☆
	Cultural Intelligence (CQ)	2	1～5①	Sasaki (Toru), ※Ohishi &※ Damaschin	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Cultural Leadership	2	1～5②	Sasaki (Toru), ※Ohishi &※ Damaschin	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Design Thinking	2	1～5①	Sasaki (Toru), ※Cristian & ※Ohishi	Recommended subject for the WISE Program ☆
	Digital Communications	2	1～5②	Sasaki (Toru), ※Ohishi &※James	Recommended subject for the WISE Program ☆
	Robotic Process Automation (RPA)	2	1～5①	Sasaki (Toru), ※Ohishi &※James	Recommended subject for the WISE Program ☆
	Social Innovation	2	1～5②	Sasaki (Toru), ※Ohishi &※（ ）	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Technology Management	2	1～5①	Sasaki (Toru), ※Ohishi &※ Sugiyama	Recommended subject for the WISE Program ☆
	Think Like A Futurist	2	1～5①	Sasaki (Toru), ※Ohishi &※Artis	Recommended subject for the WISE Program ☆

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided

2) In the "Year/Term" column, the numbers indicate the designated years and terms, respectively, for each subject (Terms are encircled)

[Symbols in the Notes Column]

E : Conducted during even-numbered years according to the Reiwa Calendar

O : Conducted during odd-numbered years according to the Reiwa Calendar

☆ : Conducted in English

※ Changes may occur according to schedule adjustments with the collaborative organizations and the progress status of research/projects

Ministry of Education, Culture, Sports, Science and Technology
Doctoral Program for World-leading Innovative & Smart Education (WISE Program)

Global Pro-Active Root Technology Program

(Course for the Master's Program and Doctoral Program)

Doctoral Program for World-leading Innovative & Smart Education (WISE Program)
(Program for the Master's Program and Doctoral Program)
WISE Global Pro-Active Root Technology Program

1. Overview and Objective

The Doctoral Program for World-leading Innovative & Smart Education (WISE Program) was established by the Ministry of Education, Culture, Sports, Science and Technology with the aim of leading the production and application of new knowledge, as well as the creation of value to drive the next generation. The program will develop a pool of doctoral talent (high-level knowledge professionals) that will undertake the challenges of solving society's problems and bringing about social innovation.

The WISE Global Pro-Active Root Technology Program aims to coordinate with industrial and overseas collaborative hubs, and nurture the development of professionals with expertise in "root technology". This technology forms the backbone of all industries and is centered on materials science and electrical power engineering (specifically, control engineering and power electronics), and will contribute to the attainment of Sustainable Development Goals (SDGs).

The program comprises three courses: the "Sustainable Mobility Course (Automotive, Railway, and Aviation Industries)", the "Smart Factory Course (Manufacturing Technology and Materials Processing Industries)" and the "Clean Manufacturing Course (Environmental, Energy, and Labor-Saving Production Industries)". Each student will receive a specialized education from his or her selected course. In addition, the students will also acquire the following four abilities by taking practical subjects: "Ability to explore new academic fields" for their specific field of study in which they are authorities as doctorate holders; "cutting-edge IT skills" that are not superficial, but will instead enable consistent progress; "progressive human qualities" that allow the creation of diverse human resource networks while pioneering new fields; and "practical capability to achieve social implementation" that facilitates the proposal of projects and solution of problems in industry.

2. Program Outline

Students enrolled in this program will take the compulsory subjects and elective-compulsory subjects presented in Attached Table 1.

The common study subjects and elective subjects are presented in the attached table of the major field's course curriculum in the master's program and doctoral program.

3. Requirements for Program Completion Certification

In order to receive a certificate of program completion, students must fulfill the requirements specified by the major field in the master's program and doctoral program, and also take the compulsory and elective-compulsory subjects specified by this program. However, the credits earned from the subjects in this program are not included the number of credits required for completion of master's program and doctoral program.

The master's thesis and doctoral thesis screening process for this program will not only include standard thesis screening, but will also involve the advancement qualification screening and thesis screening held every academic year for the WISE Program.

Students who successfully fulfill the prerequisites for program completion and complete the master's program and doctoral program will be conferred a degree certificate that indicates completion of this program.

WISE Program Subject Requirements

Students enrolled in the WISE Program must take the program's compulsory subjects and elective-compulsory subjects specified below in addition to satisfy the requirement of completion of each major in the master's program and doctoral program. (Refer also to Attached Table 1)

[Master's Program]

(1) Compulsory Subjects

Students are required to take either one of subjects below.

· Practical Work for Project Leader Education 3 credits (Elective-compulsory subject in the Science of Technology Innovation)

·International Research Internship 4 credits

Students are required to take the following subject.

· ICT Practicum 1 credit

However, the students shall be considered to have obtained the credits of this subject by taking "subject related to information technology" offerred in

The subject recognized will be indicated on the Revision to the Curriculum Table distributed in Academic Year 2022.

(2) Elective-Compulsory Subjects

Students are required to take either one of subjects or both subjects below.

· International Root Technologies School 1 credit

· Advanced Root Technologies 1 credit

[Doctoral Program]

(1) Compulsory Subjects

· Practical Work for Project Leader Education 3 credits

·International Research Internship 4 credits

The students are required to take the above subject(s) which have not been taken.

· Advanced Practical Work for Project Leader Education 1 credit

· Advanced International Research Internship 1 credit

(2) Elective-compulsory subjects

If a student has taken both "International Root Technologies School" and "Advanced Root Technologies" offered in the master's program, that student must earn 1 or more credits from the elective-compulsory subjects shown in Attached Table 1. If a student has taken either "International Root Technologies School" or "Advanced Root Technologies" offered in the master's program, that student must earn 2 or more credits from the elective-compulsory subjects shown in Attached Table 1.

○ Attached Table 1 (Applicable to students who matriculate in AY 2024)

Compulsory/ Elective	Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Compulsory	Practical Work for Project Leader Education	3	1･2①～③	Staff	Taking this subject is considered as taking an elective-compulsory subject in the Department of Science of Technology Innovation. ☆ ※
	Researcher Ethics Ⅰ	1	1･2②	Yamada (N), Ogasawara, Itoh & Nakayama	☆
	Researcher Ethics Ⅱ	1	1～5①～③	Staff	☆
	Advanced Practical Work for Project Leader Education	1	3～5①～③	Staff	Students who have taken Practical Work for Project Leader Education (3 credits) may take this subject ☆ ※
	Advanced International Research Internship	1	3～5①～③	Staff	Students who have taken International Research Internship (4 credits) may take this subject ☆ ※
	ICT Practicum	1	1～3①～③	Staff	☆ ※
Elective-Compulsory	Advanced Science of Technology Innovation Engineering	2	1･2①～②	Nakayama, Ninomiya & ※Hanada	Recommended subject for the WISE Program ☆
	Practical Work on Venture Flotation Training I	2	1･2①～③	Katagawa, Yamaguchi, Suzuki (N) & ( )	Recommended subject for the WISE Program ☆ Will not hinder the taking of GD3-5
	Practical Work on Venture Flotation Training II	1	1～5①～③	Katagawa, Yamaguchi & Suzuki (N)	Recommended subject for the WISE Program ☆
	Facilitation Engineering on Science of Technology	2	1～5②	Yamaguchi, Maki, ※Ichitsubo & Others	Recommended subject for the WISE Program ○ ☆
	Plan Drafting Method for Science of Technology	1	1～5①～③	Staff	Recommended subject for the WISE Program ☆
	Innovation Case Study	2	1～5①～③	Staff	Recommended subject for the WISE Program ☆

Compulsory/ Elective	Subject Name	Credits	Year (Term)	Lecturer-in-Charge	Notes
Elective-Compulsory	Practical Work on Research Guidance	2	1～5①～③	Staff	Recommended subject for the WISE Program ☆
	International Root Technologies School	1	1～5①～③	Staff	☆ Students must take either or both International Root Technologies School and Advanced Root Technologies
	Advanced Root Technologies	1	1～5①～③	Nakayama	☆ Students must take either or both International Root Technologies School and Advanced Root Technologies
	Business Communication	2	1～5②	Sasaki (Toru), ※Cristian & ※Ohishi	Recommended subject for the WISE Program ☆
	Creative Leadership	2	1～5②	Sasaki (Toru), ※Ohishi & ※Tajiri	Recommended subject for the WISE Program ☆
	Cultural Intelligence (CQ)	2	1～5①	Sasaki (Toru), ※Ohishi &※ Damaschin	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Cultural Leadership	2	1～5②	Sasaki (Toru), ※Ohishi &※ Damaschin	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Design Thinking	2	1～5①	Sasaki (Toru), ※Cristian & ※Ohishi	Recommended subject for the WISE Program ☆
	Digital Communications	2	1～5②	Sasaki (Toru), ※Ohishi &※James	Recommended subject for the WISE Program ☆
	Robotic Process Automation (RPA)	2	1～5①	Sasaki (Toru), ※Ohishi &※James	Recommended subject for the WISE Program ☆
	Social Innovation	2	1～5②	Sasaki (Toru), ※Ohishi &※（ ）	Recommended subject for the WISE Program ☆ Not conducted in 2024
	Technology Management	2	1～5①	Sasaki (Toru), ※Ohishi &※ Sugiyama	Recommended subject for the WISE Program ☆
	Think Like A Futurist	2	1～5①	Sasaki (Toru), ※Ohishi &※Artis	Recommended subject for the WISE Program ☆

1) In the "lecturer-in-charge" column, ※ indicates an adjunct lecturer and ( ) indicates that the lecturer is undecided

2) In the "Year/Term" column, the numbers indicate the designated years and terms, respectively, for each subject (Terms are encircled)

[Symbols in the Notes Column]

E : Conducted during even-numbered years according to the Reiwa Calendar

O : Conducted during odd-numbered years according to the Reiwa Calendar

☆ : Conducted in English

※ Changes may occur according to schedule adjustments with the collaborative organizations and the progress status of research/projects

SDG Professional Course

* This course is offered to the students who passed the entrance examination for the SDG Professoinal Course and have been admitted to the master's program or doctoral program in the course.

SDG PROFESSIONAL COURSE

1. Overview

This graduate-level course incorporates engineering education built on a foundation of Sustainable Development Goals (SDGs), and is designed to produce practical engineers/researchers with high levels of expertise and various perspective, as well as educators of advanced engineering.

In 2015, the United Nations designated a set of 17 global SDGs (addressing issues such as poverty, healthcare, education, and others) to be achieved by 2030. In order to accomplish these goals, it is crucial to further develop and spread science and technology on a global scale. We have committed to this effort by accepting students from a wide range of countries and providing them with a practical education program in collaboration with Japanese industries. In this way, we aim to nurture the development of individuals who can contribute to the development of science and technology, especially in newly industrialized countries.

Since 1994, NUT has conducted the International Graduate Course for Continuing Professional Development (CPD), which has produced over 300 practical engineers and educators from 15 countries. The SDG Professional Course (SDG-P) expands upon the CPD Course with the inclusion of SDG principles, and is a more advanced practical engineering education program. We anticipate that course graduates will be active in various countries throughout the world, help to improve the global level of science and technology, and contribute to the accomplishment of the SDGs.

2. Course Outline

(1) Master's Program

① Subject Requirements

Students enrolled in the SDG Professional Course must earn 6 credits from course-compulsory subjects and 2 or more credits from course-recommended elective-compulsory subjects as stated below (See Attached Table 1). These students are strongly recommended to register for the SDG Professional Course subjects offered by each program.

◆Course-Compulsory Subjects

Japanese Industrial Development and SDGs	2 credits
Gigaku Innovation and Creativity	2 credits
SDGs -recognizing limitations and challenges-	2 credits

◆Course-Recommended Elective-Compulsory Subjects

Internship for SDG-P Course Students	2 credits
General Affairs of Japan for Graduate Students 1-2	2 credits

* In cases where Common Study Subjects (including those listed above) have already been taken, students may include up to 6 credits from the Common Study Subjects required by the relevant program.
* In addition to the subjects listed above, students may also take "Basic Japanese Language Course 1" and "Business Japanese Language for Beginners" as extracurricular subjects. However, in order to take the "Internship for SDG-P Course Students", students must have, in principle, completed "Basic Japanese Language Course 1" and "Business Japanese Language for Beginners" before

registering for the internship.

② Course Completion

In order to complete the course, students must earn 6 credits from course-compulsory subjects, “Japanese Industrial Development and SDGs”, “Gigaku Innovation and Creativity” and “SDGs -recognizing limitations and challenges-”, and 2 or more credits from course-recommended elective-compulsory subjects. Students who fulfill the prerequisites for completing the course and the master’s program will be awarded a Certificate of Completion of the SDG Professional Course in addition to the master’s degree.

In order to complete the master’s program, students must also complete the SDG Professional Course after being admitted.

(2) Doctoral Program

① Subject Requirements

Students enrolled in the SDG Professional Course are required to take the following course-compulsory subject (See Attached Table 2).

◆Course-Compulsory Subject

SDGs Interdisciplinary Joint Project Study 2 credits

This is a course-compulsory subject, and the credits earned from this subject will not count toward the required credits for completing the doctoral program.

* In addition to the subject listed above, students may also take “Basic Japanese Language Course I” and “Business Japanese Language for Beginners” as extracurricular subjects.

② Course Completion

In order to complete the course, students must earn the credits from the course-compulsory subject “SDGs Interdisciplinary Joint Project Study”. Students who fulfill the prerequisites for completing the course and the doctoral program will be awarded a Certificate of Completion of the SDG Professional Course in addition to the doctoral degree.

In order to complete the doctoral program, students must also complete the SDG Professional Course after being admitted.

(3) Student Admissions

Students will be admitted to this course if they pass the selection entrance examination for the SDG Professional Course and have been admitted to either the master’s or doctoral programs (including students who have completed the master’s program under this course and advanced to the doctoral program) at the Graduate School of Engineering, NUT.

SDG PROFESSIONAL COURSE

Attached Table 1

Master's Program

Eligible Programs	Subject Classification	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
All Programs	Compulsory (6 Credits)	Japanese Industrial Development and SDGs	2		2		Katsumi	☆ K A Subject is offered from the 1st to 2nd years, but students are encouraged to take the subject in the 1st year.
		Gigaku Innovation and Creativity	2	2			Manada	☆ Subject is offered from the 1st to 2nd years, but students are encouraged to take the subject in the 1st year.
		SDGs -recognizing limitations and challenges-	2		2		Takimoto	☆
	Elective-Compulsory (2 Credits)	Internship for SDG-P Course Students	[2]	[2]			Iwahashi, Staff	☆
		General Affairs of Japan for Graduate Students 1-2	2		2		Kano	☆

Note 1: In the "Lecturer-in-Charge" column, ※ indicates an adjunct lecturer

Note 2: [2] indicates credits that do not count toward program completion

Attached Table 2

Doctoral Program

Eligible Programs	Subject Classification	Subject Name	Credits	1st Year to 2nd Year Term 1	2	3	Lecturer-in-Charge	Notes
All programs	Compulsory	SDGs Interdisciplinary Joint Project Study	[2]		[2]		Hatamoto	Subject is offered from the 1st to 2nd years, but students are encouraged to take the subject in the 1st year.

Note 1: [2] indicates credits that do not count toward program completion

【Symbols in the Notes Column】

K: Industry-Associated Subject for Teacher's License Certification

☆: Conducted in English

A: Can be conducted in English for SDG Professional Course students

Applied Safety Engineering Course

(Course for All Master's Programs, including the System Safety Engineering)

Applied Safety Engineering Course (Open to All Majors in the Master's Program Excluding System Safety Engineering)

1. Overview and Objectives

Safety has become more important than ever before due to increasingly sophisticated and complex technologies, large-scale business activities, and society's demands on the activities of organizations and corporations. The continued existence of organizations and corporations is contingent on ensuring safety in the workplace and providing safe goods and services to consumers. In this context, there is a societal need for universities to train individuals who have in-depth expertise that can be applied to safety-related issues and new technologies, logical thinking abilities and creative abilities, as well as excellent problem-solving capabilities for safety-related problems. In other words, there is a widespread need for education and research on safety engineering.

The Applied Safety Engineering Course aims to facilitate the acquisition of fundamental and applied knowledge of safety engineering. Course graduates should aim to obtain System Safety Sub-Engineer certification (System Safety Engineer Certification System).

2. Course Outline

(1) Course Requirements

Students must take the common subjects and specialized subjects offered in each major shown in the list of subjects in **Table 1**.

(2) Course Application

This course is open to students in the master's programs of all majors except System Safety Engineering. Students who wish to apply for this course must submit the *Application for the Applied Safety Engineering Course* to the Division of Academic Affairs during the stipulated registration period (scheduled to be the subject registration periods of the First Term and Second Term). When taking a subject, students should carefully check all distributed handouts and follow the procedures.

(3) Course Completion

To complete this course, students must earn a total of 8 credits from the subjects shown in **Table 1**: 4 credits from "Advanced Safety Engineering", "Advanced Safety and Information Security 1", and "Advanced Safety and Information Security 2" (course compulsory subjects); 2 credits from "Advanced Lecture on Risk Assessment" or "Construction of Safety System", which address the foundational knowledge for practical applications of safety engineering (course elective-compulsory subjects ●); and 2 credits from safety-related subjects offered in each of the majors (course elective-compulsory subjects ○).

Students who complete the course will be conferred a certificate of course completion upon graduation from the master's program.

◆Applied Safety Engineering Course（Attached Table 1）

Subject Name	Credits	Compulsory/Elective	Major/Subject Classification	Term
Advanced Safety Engineering	2	**Compulsory**	Common Subjects	2nd Term
Advanced Safety and Information Security 1	1	**Compulsory**	Common Subjects	2nd Term
Advanced Safety and Information Security 2	1	**Compulsory**	Common Subjects	2nd Term
●Advanced lecture on risk assessment	2	**Elective Compulsory (acquire a minimum of 2 credits from "●" subjects)**	Major Subject of System Safety Engineering	1st Term
●Construction of Safety System	2		Major Subject of System Safety Engineering	2nd Term
○Snow and Ice Technology	2	**Elective Compulsory (acquire a minimum of 2 credits from "○" subjects)**	Major Subject of Mechanical Engineering	1st and 2nd Term
○Advanced Course for Mechatronics	2		Major Subject of Electrical, Electronical and Information Engineering	2nd Term
○Advanced Engineering on Electrical Machine	2		Major Subject of Electrical, Electronical and Information Engineering	2nd Term
○Advanced Medium Voltage Converters	2		Major Subject of Electrical, Electronical and Information Engineering	1st Term
○Sustainable Development Theory	2		Major Subject of Information and Management Systems Engineering	1st Term
○Energy Economics	2		Major Subject of Information and Management Systems Engineering	1st Term
○Principles in Drug Action	2		Major Subject of Materials Science and Bioengineering	1st Term
○Advanced course of disaster management	2		Major Subject of Civil and Environmental Engineering	2nd Term
○Nuclear Power Reactor and Plant Systems	2		Major Subject of Nuclear Technology	1st Term
○Advanced Safety and Crisis Management	2		Major Subject of Nuclear Technology	1st Term
○Advanced Lecture on Nuclear Regulation	2		Major Subject of Nuclear Technology	1st Term
○Advanced Seismic Safety Engineering and Community Disaster Management	2		Major Subject of Nuclear Technology	2nd Term
○Nuclear Emergency Planning and Resilience Engineering	2		Major Subject of Nuclear Technology	2nd Term

*To count subjects indicated with ● and subjects from other majors indicated with ○ as completion criteria for the master's program, approval must first be obtained from each student's academic supervisor.

*For subjects indicated with ●, classes will mainly be held on Saturdays and Sundays. Students should only take these subjects after carefully checking the schedule and class methods in the syllabus and distributed handouts. If there are many applications for "Advanced Lecture on Risk Assessment", students may be required to undergo selection for registration. Please refer to the distributed handouts and other materials for details.

Advanced Safety Engineering Course

(Open to All Majors in the Doctoral Program)

Advanced Safety Engineering Course
(Open to All Majors in the Doctoral Program)

1. Overview and Objectives

The importance of safety is now higher than ever before due to increasingly sophisticated and complex technologies, large-scale business activities, and society's demands on the activities of organizations and corporations. The continued existence of organizations and corporations is contingent on ensuring safety in the workplace and providing safe goods and services to consumers.

Under these conditions, there is a societal need for universities to train persons who have in-depth expertise that can be applied to safety-related issues and new technologies, logical thinking abilities and creative abilities, as well as excellent problem-solving capabilities for safety-related problems. There is also a widespread need for education and research on safety engineering.

The Advanced Safety Engineering Course aims to nurture the development of persons with the research abilities that can be applied to safety-related issues and new technologies, as well as the practical abilities to solve safety-related problems. These trained persons will lead innovations as safety experts with both research abilities and practical abilities. In addition, they will also be the driving force for the establishment of international standards that lead global society, and contribute to the further development of Japan.

2. Course Outline

(1) Course Application

Students from any major in NUT's doctoral program can apply to this course. Students who wish to apply to this course should submit the *Safety Engineering Course Application Form* to the Division of Academic Affairs during the stipulated application period posted on the course notice board.

(2) Course Requirements and Conditions for Completion

Students enrolled in this course must earn 6 credits or more from subjects marked with an "S" in their majors' Curriculum Tables (Attached Tables). (Check the subjects marked with an "S" in the Curriculum Tables of Energy Engineering, Information Science and Control Engineering, Materials Science, and Civil Engineering and Bioengineering.)

(3) Course Completion

Students who fulfill the prerequisites for completing the course and the doctoral program will be conferred a certificate of course completion in addition to the doctoral degree.

E-Learning Subjects

E-learning subjects are open to current students enrolled as credit auditing students and exchange students under credit transfer agreements.

(Applicable to students who enroll in AY 2024)

Compulsory /Elective	Subject Name	Credits	1st Year to 2nd Year Term			Lecturer-in-Charge	Notes
			1	2	3		
Elective	e-Energy Economics	2	●			Li	
	Total	2					

Special Subjects for Exchange Students under Academic Exchange Agreements

The following subjects are offered to exchange students who are attending NUT as part of academic exchange agreements. Subjects are to be taken after discussions with the relevant lecturer-in-charge.

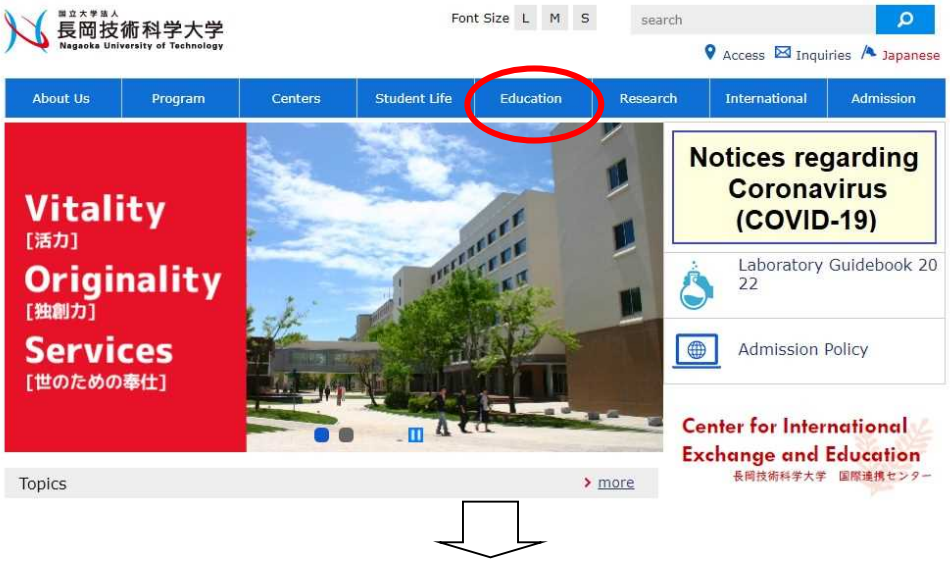
Master's/Doctoral Program (Applicable to students who enroll in AY 2024)

Subject Name	Credits	Term			Lecturer-in-Charge	Notes
		1	2	3		
Research Internship 1	4		●		Staff	Subject Duration: 2 months or longer; shorter than 3 months
Research Internship 2	8		●		Staff	Subject Duration: 3 months or longer
Project Study GS1	4		●		Staff	Subject Duration: 2 months or longer; shorter than 3 months
Project Study GS2	8		●		Staff	Subject Duration: 3 months or longer
Total	24					

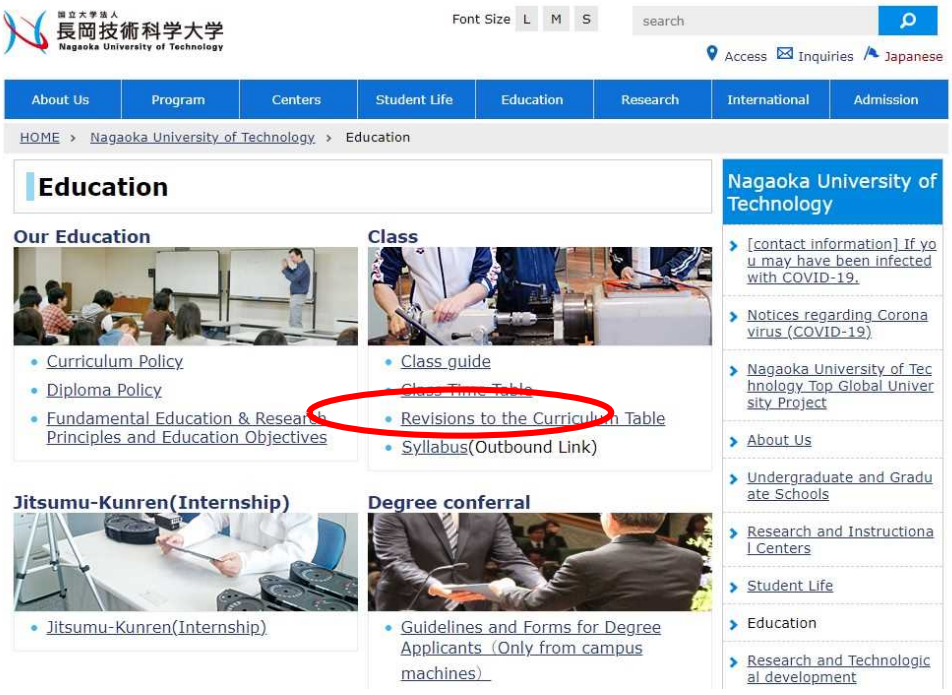
Syllabus

Accessing the Syllabus via Web Browser

Students can search and view Nagaoka University of Technology's syllabus online via web browser.



From NUT's official website (nagaokaut.ac.jp/e/), select "Education" tab from the menu



Under "Classes", Select "Syllabus"

In the "Title" section, select the desired syllabus according to year and undergraduate/graduate program.

Subjects can be searched according to subject classification (Folder), subject name, Teaching Staff Name, and free search word.

School Regulations

(As of February 2024)

National University Corporation Nagaoka University of Technology Rules (Extract)

Chapter 1. General Provisions
Section 1. Purpose
(Purpose)
Article 1. The University aims to, based on the School Education Act (Act No. 26 of 1947), promote research particularly addressing the development of practical technology, as well as to foster leading engineers with practical, creative capability.

Section 5. Academic Year, Terms, and Holidays
(Academic Year)
Article 11 The academic year begins on April 1 and ends on March 31 of the following year.

(Terms)
Article 12 The academic year is divided into three terms.
First term: April 1 to August 31
Second term: September 1 to December 31
Third term: January 1 to March 31

(Holidays)
Article 13 (1) The holidays for the School of Engineering and the Graduate School of Engineering are described as shown below. However, items i to iii are excluded in the System Safety Engineering.
(i) Sundays and Saturdays
(ii) Holidays stipulated in the Act on National Holidays (Act No. 178 of 1948)
(iii) University Foundation Day on October 1
(iv) Spring Vacation: March 26 to April 4
(v) Summer Vacation: July 24 to August 31
(vi) Winter Vacation: December 25 to January 7 of the following year

(2) The President may, when deemed necessary, temporarily change holidays presented in the preceding two paragraphs, or temporarily specify holidays.

Chapter 2. Undergraduate
Section 3. Absence and Withdrawal from School
(Absence from School)
Article 26 (1) A person who is unable to study for two months or more because of illness, volunteer activities, or other special reason may take a leave of absence from school after obtaining permission from the President.
(2) For a person deemed to be unable to study because of illness, the President may order that the student take a leave of absence from school.

(Period of Absence from School)
Article 27 (1) A period of absence from school shall not exceed one year. However, when there is a special reason, the extension of the period of absence from school might be permitted with the limit of one year.
(2) The period of absence from school may not exceed two years in total. However, absences from school for school-sanctioned volunteer activities or for other reasons specified separately shall not be counted for the purposes of this limitation.
(3) The period of absence from school shall not be included in the years of attendance.

(Returning to School)
Article 28 When a reason ceases to exist during absence from school, the person may return to school after obtaining permission from the President.

(Studying Abroad)

Article 29 (1) For a person who applies to study at university or junior college in a foreign country, the President may permit the student to study abroad after hearing the opinions of the Faculty Meeting.

(2) The period studying abroad with the permission in the preceding paragraph might be included in the years of attendance prescribed in Article 46.

(Leaving School)

Article 30 A student who intends to leave school must obtain permission from the President.

(Expulsion from School)

Article 31 Those to whom any of the following items apply shall be expelled from school by the President after hearing the opinions of the Faculty Meeting.

(i) Have exceeded the years of attendance prescribed in Article 15

(ii) Remain unable to study even after the period of absence from school prescribed in Article 27 has passed

(iii) Have gone missing for a long period of time

(iv) Are not granted a waiver or are granted a half-waiver among those who have applied for the admission fee waiver, and who have not paid the admission fee by the prescribed date

(v) Have applied for the admission fee postponement and have not paid the admission fee by the designated date

(vi) Are delinquent in the payment of tuition fees and do not pay even after being pressed for the payment

Section 4. Curriculum and Methods of Taking Subjects

(Class Methods)

Article 36 (1) The University shall conduct classes in the form of lecture, seminar, experiment, practical training, or skills practice, or in a combination of them.

(2) The University may have students take the classes described in the preceding paragraph in places other than a classroom where the classes are conducted, using media of various types in a highly advanced manner, as specified separately by the Minister of Education, Culture, Sports, Science and Technology.

(3) The University may have students take the classes in paragraph (1) in foreign countries. The same shall apply to the case in which the University has students take classes in places other than a classroom where the classes are conducted, using media of various types in a highly advanced manner, as prescribed in the preceding paragraph.

(4) The University may conduct part of the classes in paragraph (1) in places other than school buildings and attached facilities, as specified by the Minister of Education, Culture, Sports, Science and Technology.

(Credit Calculation Methods)

Article 37 (1) A class subject with one credit shall be composed of the content requiring 45 hours of learning as standard. The number of credits shall be calculated based on the following standards, according to the class method and considering the educational effects of the class and the learning required outside of the class hours.

(i) With regard to lectures and seminars, one credit shall consist of the number of class hours prescribed separately, ranging from 15 hours to 30 hours.

(ii) With regard to experiments, practical training, and skills practice, one credit shall consist of the number of class hours prescribed separately, ranging from 30 hours to 45 hours.

(2) Despite the provisions of the preceding paragraph, the University may determine the number of credits for some class subjects, such as graduation research, considering the learning, etc. necessary for these activities, when it is deemed to be appropriate to grant credits by evaluating the achievement of such learning.

(Period of Classes for Each Class Subject)

Article 38 Classes of each class subject shall be conducted with 15 weeks as a unit. However, this shall not apply in cases for which it is deemed to be necessary from an educational perspective and able to achieve sufficient educational effects.

(Granting of Credits)

Article 40 The University shall grant students prescribed credits after they have completed a class subject and passed the examination. However, with regard to the class subjects prescribed in paragraph (2) of Article 37, the University may grant credits by evaluating students' academic achievements using an appropriate method.

(Evaluation of Results)

Article 45 Examination results of class subjects shall be presented with five grades of S, A, B, C, and D, of which S, A, B, and C shall be the grades of PASS and D shall be the grade of FAIL. However, when finding it necessary, the University may replace the passing grades of S, A, B, and C with G.

Chapter 3. Graduate School

Section 1. Years Required for Graduation

(Standard Years Required for Graduation)

Article 49 (1) The standard number of years required for graduation for the doctoral degree program shall be five years.

(2) The standard number of years required for graduation for the master's programs shall be two years.

(Years of Attendance)

Article 50-1 The 5-year integrated doctoral program, the master's program, and the doctoral program might not be attended for a period exceeding eight years, three years, and five years, respectively.

(Long-term Studying Students)

Article 50-2 Despite the provisions of the preceding two articles, the years required for graduation, the years of attendance, etc. for those who take a course of study over a certain period of time exceeding the standard years required for graduation in a planned manner because of the circumstances such as having an occupation shall be provided for separately.

Section 2. Admissions

(Time of Admission)

Article 51 Admission shall be processed at the beginning of each academic year or the beginning of the second term.

(Eligibility for Admission)

Article 52 (1) Those to whom any of the following items apply shall be eligible to enter the graduate schools.

(i) Graduated from a university specified in paragraph (1) of Article 83 of the School Education Act

(ii) Been conferred a bachelor's degree under the provisions of paragraph (4) of Article 104 of the School Education Act

(iii) Completed a 16-year course of school education in a foreign country

(iv) Completed a 16-year course of school education in a foreign country by taking class subjects in Japan through a correspondence course offered by an educational institution in the country

(v) Completed a course of school education in Japan offered by an educational institution in a foreign country that is regarded as having the course of university education under the school education system of the country (limited to those in which a person who has completed the course is regarded as to have completed a 16-years course of school education in the country) and is separately designated by the Minister of Education, Culture, Sports, Science and Technology

(vi) Have been conferred a degree equivalent to a bachelor's degree by completing a course of study for which the years required for graduation are three years or more (including to complete the course by taking the class subjects in Japan through a correspondence course offered by the educational institution in the foreign country and to complete a course at an educational institution that is placed in the school education system in the country and has obtained the designation in the preceding item) at a university or an educational institution in a foreign country (limited to those for whom the overall situation, such as the education and research activities has been

assessed by a person who has received certification from the foreign government or concerned agencies, or that has been designated separately by the Minister of Education, Culture, Sports, Science and Technology as equivalent to them)

(vii) Completed a specialized course at specialized training college (limited to those meeting standards specified by the Minister of Education, Culture, Sports, Science and Technology, such as the number of years required for graduation is four years or more) separately designated by the Minister of Education, Culture, Sports, Science and Technology on or after the day specified by the Minister.

(viii) Are designated by the Minister of Education, Culture, Sports, Science and Technology

(ix) Attended the University for three years or more, or has completed a 15-year course of school education in a foreign country and who are found to have acquired the prescribed credits with excellent results by the President

(x) Are found to have academic ability equivalent to or greater than a university graduate by the President, through an individual admission eligibility screening, and have reached 22 years of age

(2) Those who fall under any of the following items shall be eligible to enter the doctoral programs.

(i) Have a master's degree

(ii) Have a degree specified by the Minister of Education, Culture, Sports, Science and Technology in paragraph (3) of Article 104 of the School Education Act (hereinafter, "professional degree")

(iii) Have been conferred a degree in a foreign country equivalent to a master's degree or a professional degree

(iv) Have taken class subjects in Japan through a correspondence course offered by an educational institution in a foreign country and have been conferred a degree equivalent to a master's degree or a professional degree

(v) Completed a course of school education in Japan offered by an educational institution in a foreign country that is regarded as to have the course of graduate school education under the school education system of the country and separately designated by the Minister of Education, Culture, Sports, Science and Technology and who have been conferred a degree equivalent to a master's degree or a professional degree

(vi) Completed a course of study at United Nations University ("United Nations University" in Article 66) specified in paragraph (2) of Article 1 of the Act on Special Measures Incidental to Enforcement of the "Agreement between the United Nations and Japan regarding the Headquarters of the United Nations University" (Act No. 72 of 1976) and who have been conferred a degree equivalent to a master's degree

(vii) Have taken a course of school education at a school in a foreign country or an educational institution that has received the designation in item (v) or at United Nations University pass the examination and the screening specified in Article 16-2 of the Standards for Establishment of Graduate Schools (Ordinance of Ministry of Education No. 28 of 1974) and are deemed as to have an academic ability equivalent to or greater than a master's degree holder

(viii) Are designated by the Minister of Education, Culture, Sports, Science and Technology

(ix) Are found to have academic ability equivalent to or greater than a master's or professional degree holder by the President, through an individual admission eligibility screening, and have reached 24 years of age

(Application for Admission and Entrant Selection)

Article 53 Provisions from Article 19 through Article 21 shall apply with the necessary modifications to application for admission, selection method, etc.

(Advancement to Doctoral Program)

Article 54 For a person who has completed a master's program at the University and who applies in advance to a doctoral program continuously, the University will permit advancement after making a selection.

(Readmission)

Article 55-1 When a person who was permitted to leave school under the provisions of Article 58 and who applies for readmission to the graduate school, the President may grant admission to the appropriate year after hearing the opinions of the Faculty Meeting as provided for separately at the beginning of the academic year or the beginning of the second term.

(Transfer)

Article 55-2 When a person applies for transfer to a graduate school of the University, the President may grant admission to the appropriate year after hearing the opinions of the Faculty Meeting at the beginning of the academic year or the beginning of the second term.

(Third-year Transfer)

Article 55-3 (1) When a person with any of the qualifications listed in paragraph (2) of Article 52 wishes to transfer into the third year of the 5-year integrated doctoral program, the President may grant admission to the third year after hearing the opinions of the Faculty Meeting at the beginning of the academic year or the beginning of the second term.

(2) The handling of previously acquired credits described in the preceding paragraph shall be provided for separately.

(Changes to Programs or Majors)

Article 56 When a person applies to change the program or major, the President may permit to change the program or major to the appropriate year after hearing the opinions of the Faculty Meeting at the beginning of the academic year or the beginning of the second term.

(Handling of Cases of Readmission, Transfer, etc.)

Article 57 The handling of the number of years that a person who has been granted admission, etc. under the provisions in Article 55, paragraph (2) of Article 55 and Article 56 must attend and the credits that the person has already acquired shall be provided for by the President after hearing the opinions of the Faculty Meeting.

Section 3. Absence and Withdrawal from School

(Application with the Necessary Modifications to Absence from, Returning to and Leaving School)

Article 58 The provisions of Article 26, Article 28, and Article 30 shall apply with the necessary modifications to absence from, returning to, and leaving school.

(Period of Absence from School)

Article 59 (1) A period of absence from school shall not exceed one year for each of the 5-year integrated doctoral program, master's programs, and doctoral programs. However, when there is a special reason, the extension of the period of absence from school might be permitted with the limit of one year, respectively.

(2) The period of absence from school shall not exceed two years in total in any of the 5-year integrated doctoral program, master's programs, and doctoral programs, respectively. However, absences from school for school-sanctioned volunteer activities or for other reasons specified separately shall not be counted for the purposes of this limitation.

(3) The period of absence from school shall not be included in the years of attendance.

(Studying Abroad)

Article 60 (1) For a person who applies to study at graduate school in a foreign country, the President may permit study abroad after hearing the opinions of the Faculty Meeting.

(2) The period of studying abroad with the permission in the preceding paragraph might be included in the years of attendance prescribed in Article 69.

(Expulsion from School)

Article 61 Those to whom any of the following items apply shall be expelled from school by the President after hearing the opinions of the Faculty Meeting.

(i) Have exceeded the years of attendance prescribed in Article 50-1 or Article 50-2

(ii) Remain unable to study even after the period of absence from school prescribed in Article 59 has passed

(iii) Are applicable to any of the items, from item (iii) through item (vi) of Article 31

Section 4. Curriculum and Methods of Taking Classes

(Classes and Research Guidance)

Article 62 The education at graduate school shall be conducted in forms of teaching of class subjects and guidance for thesis writing, etc. (hereinafter, “research guidance”).

(WISE Program)

Article 62-2

(1) The Doctoral Program for World-leading Innovative & Smart Education (WISE Program) was established with the aim of leading the production and application of new knowledge, as well as the creation of value to drive the next generation. The program will develop a pool of doctoral talent that will undertake the challenges of solving society’s problems and bringing about social innovation.

(2) Necessary matters related to the WISE Program shall be provided for separately.

(Special Cases of Education Method)

Article 63-1 The University may, when finding it particularly necessary from an educational perspective, provide education in the graduate programs using appropriate methods, such as conducting classes or research guidance in the evening or other specific hours or time.

(Organizational Training for Improvement of Content of Education)

Article 63-2 The graduate schools shall implement organizational training and research to improve the contents and the methods of classes and research guidance.

(Class Subjects)

Article 64 Class subjects and the number of the credits shall be provided for separately.

(Application with the Necessary Modifications to Class Method, etc.)

Article 65 The provisions of Article 36, Article 37, Article 38, Article 40, and Article 45 shall apply with the necessary modifications to class method, credit calculation method, period of classes for each class subjects, granting of credits, and evaluation of results.

(Taking Class Subjects at Other Graduate Schools)

Article 66 (1) In cases for which it is deemed to be effective from the perspective of education and research, when the President finds it appropriate after hearing the opinions of the Faculty Meeting, based on consultations with other graduate schools, the University may regard the credits that students have acquired by completing class subjects at other graduate schools as credits acquired by completing class subjects at a graduate school of the University, to an extent not exceeding 15 credits.

(2) The provisions in the preceding paragraph shall apply with the necessary modifications in cases where students study abroad under the provisions of Article 60, where students take class subjects in Japan through a correspondence course offered by a graduate school in a foreign country, where students take class subjects of a course of study in Japan offered by an educational institution in a foreign country that is regarded to have the course of graduate school education under the school education system of the country and separately designated by the Minister of Education, Culture, Sports, Science and Technology, and where students take class subjects of a course of study at the United Nations University.

(Research Guidance in Other Graduate Schools)

Article 67 (1) In cases for which it is deemed to be effective from the perspective of education and research, based on consultations with other graduate schools or research institutions, the University may permit graduate students to receive necessary research guidance at the other schools, research institutions, etc. However, for cases in which the University permits students in master’s programs to do so, the period to receive the research guidance shall not exceed one year.

(2) The provisions of the preceding paragraph shall apply with the necessary modifications in cases where students study at graduate school, etc. abroad.

(3) Necessary matters related to research guidance in other graduate schools, etc. shall be provided for separately.

(Approval of Credits Acquired before Admission)

Article 68 (1) For cases in which it is deemed to be effective from the perspective of education and research, when the President finds it appropriate after hearing the opinions of the Faculty Meeting, the University may regard the credits (including credits acquired as a credited auditor) of class subjects that students have taken at graduate schools (including graduate schools in foreign countries) before entering a graduate school of the University as the credits that are acquired by taking class subjects in a graduate school of University after entering a graduate school of the University.

(2) The number of previously acquired credits that may be regarded as having been acquired at a graduate school of the University under the preceding paragraph shall not exceed 15 credits (excluding transfer admissions). In addition, the total number of these credits combined with the credits regarded as having been acquired at a graduate school of the University under paragraph (1) of Article 66 (including cases that apply to paragraph (2) of the same Article) shall not exceed 20 credits.

Section 5. Completion of Programs and Degrees

(Completion of Master's and Doctoral Programs)

Article 69-1 (1) The requirements for completion of a master's program shall be to attend a graduate school for two years or more, acquire 30 credits or more in the designated class subjects prescribed separately, submit a master's thesis after receiving necessary research guidance, and pass the thesis screening and the final examination. However, with regard to the years of attendance, attending a graduate school for one year or more shall be regarded as sufficient for those who have made excellent achievements.

(2) In the case of the preceding paragraph, when the President finds it appropriate after hearing the opinions of the Faculty Meeting, the screening of a master's thesis might be replaced with the screening of research results on a specific topic.

(3) Requirements for completion of a doctoral degree program shall be to attend a graduate school for five years or more (including the two years of attendance in a separated doctoral program in the case of those who have attended for two years or more and completed a master's program), acquire 42 credits or more in the designated class subjects prescribed separately (including 30 credits in a master's program in the case of separated doctoral program), submit a doctoral dissertation after receiving necessary research guidance, and pass the dissertation screening and the final examination. However, with regard to the years of attendance, attending a graduate school for three years or more (including the two years of attendance in a separated doctoral program in the case of those who have attended for two years or more and completed a master's program) shall be regarded as sufficient for those who have made excellent achievements.

(4) The requirements for completion of a doctoral degree program for those who have completed a master's program with the years of attendance under the provisions of the proviso to paragraph (1) shall be to attend a graduate school for attendance in the master's program plus three years or more, acquire 42 credits or more in the designated class subjects prescribed separately (including 30 credits in a master's program), submit a doctoral dissertation after receiving necessary research guidance, and pass the dissertation screening and the final examination. However, with regard to the years of attendance, attending a graduate school for three years or more (including years of attendance in a master's program) shall be regarded as sufficient for those who have made excellent achievements.

(5) Despite the provisions of the preceding two paragraphs, the requirement for completion of a doctoral degree program in cases where those who are deemed to have academic ability equivalent to or greater than a master's or professional degree holder under the provisions of Article 156 of the Ordinance for Enforcement of the School Education Act (Ordinance of Ministry of Education No. 11 of 1947) in terms of the eligibility for admission to a graduate school or who have completed the professional degree course enter a doctoral program shall be to attend a graduate school for three years (two years in the case of those who have completed a course of study at law school in paragraph (1) of Article 18 of the Standards for Establishment of Professional Graduate schools; Ordinance of Ministry of Education, Culture, Sports, Science and Technology No. 16 of 2003), acquire 12 credits or more in the designated class subjects prescribed separately, submit a doctoral dissertation after receiving necessary research guidance, and pass the dissertation screening and the final examination. However, with regard to the years of

attendance, attending a graduate school for one year or more (in the case of those who have completed a professional degree course for which the standard years required for graduation is one year or more but fewer than two years, the period obtained by deducting the one year or more but less than two years from three years) shall be regarded as sufficient for those who have made excellent achievements.

(6) The handling of the number of acquired credits for those who are specified in the proviso to the preceding three paragraphs shall be provided for separately.

(7) Out of the 30 credits to be acquired as the requirements for completion of a master's program prescribed in paragraph (1), the number of credits acquired by the class method in paragraph (2) of Article 36 shall not exceed 10 credits. However, when it is deemed particularly necessary from an educational perspective, this may exceed 10 credits.

(8) Out of 42 credits to be acquired as the requirements for completion of a doctoral degree program prescribed in the paragraph (3) and paragraph (4), the number of credits acquired by the class method in paragraph (2) of Article 36 shall not exceed 22 credits (including the number of credits acquired in a master's program by the class method in paragraph (2) of Article 36) However, when it is deemed particularly necessary from an educational perspective, this may exceed 22 credits.

(9) The 12 credits to be acquired as the requirements for completion of a doctoral degree program prescribed in paragraph (5) might be acquired by the class method in paragraph (2) of Article 36.

(10) The number of credits prescribed in the preceding three paragraphs shall include the number of credits acquired by the class method in paragraph (2) of Article 36 out of the number of credits that are regarded as to have acquired under Article 66 and Article 68.

(11) Approval of completion of a master's program or a doctoral degree program shall be made by the President after hearing the opinions of the Faculty Meeting.

(Reduction of the Period of Enrollment)

Article 69-2 Cases in which credits acquired before admission to a graduate school of the University (limited to credits acquired after fulfilling the admission criteria as prescribed in paragraph (1) of Article 102 of the School Education Act) may be regarded as having been acquired at a graduate school of the University under paragraph (1) of Article 68. In cases where these previously acquired credits are recognized as partial completion of the curriculum in the master's or doctoral programs (excluding the curriculum of the doctoral program in the separated doctoral program) in a graduate school of the University, the duration of time needed to acquire those credits may be regarded as part of the stipulated period of enrollment in a graduate school of the University to an extent not exceeding one year. However, even in such cases, students must be enrolled in the master's program for a minimum period of one year.

(Conferral of Degree)

Article 70 (1) The University shall confer a master's degree, and a doctoral degree on students who have completed a master's program, and a doctoral degree program, respectively.

(2) In addition to those in the preceding paragraph, a doctorate might be conferred on those who submit a doctoral dissertation to a graduate school of the University, pass the dissertation screening, and are confirmed to have academic ability equal to or greater than a person who has completed a doctoral degree program at a graduate school of the University.

(3) Necessary matters related to the conferral of degrees shall be provided for separately.

Chapter 4. Common Provisions

Section 1. Rewards and Punishments

(Commendation)

Article 72 A student who has performed an act that is worthy of recognition may be commended by the President.

(Disciplinary Action)

Article 73 (1) Those who act against the rules of the University or commit an act violating the duty as a student will be given disciplinary action by the President after hearing opinions at a Faculty Meeting.

(2) The types of disciplinary action in the preceding paragraph shall be expulsion, suspension, and warning.
(3) The expulsion in the preceding paragraph shall be given to those who are applicable to the following items.
(i) Behave delinquently and are deemed as to have no prospect for improvement
(ii) Are deemed as to have no prospects for completion of the study because of inferior academic ability, etc.
(iii) Often do not attend school, giving no reasonable grounds for absence
(iv) Disturb the orders of the University and violate the duties of a student
(4) Necessary matters related to the disciplinary action procedures for students shall be provided for separately.

Guidelines for the Application of National University Corporation Nagaoka University of Technology Rules (Extract)

The application of the National University Corporation Nagaoka University of Technology Rules shall be determined by these guidelines.

Regarding Article 69 (Completion of Master's and Doctoral Programs):

1. The period for completing programs at the Graduate School is the end of the academic year as provided in Article 11, as well as the end of the terms as provided in Article 12.
2. Notwithstanding the provision of the preceding paragraph, the period for completing programs for students whose period of enrollment has exceeded the standard term of study due to absence from school or other unavoidable reasons as provided in Article 49 or students who have completed the program according to the provisions provided in Article 69, paragraph (1) and paragraphs (3) to (5) will also include the last day of June or September, in addition to the periods provided in the preceding paragraph.

Supplementary Provisions

(1) These guidelines shall be implemented from April 1, 2021.

National University Corporation Nagaoka University of Technology Degree Rules

April 1, 2004
Rules No. 38

(Purpose)

Article 1 These Rules prescribe necessary matters related to the conferral of degrees by Nagaoka University of Technology (hereinafter, the "University") based on the provisions of Article 13 of the Degree Rules (Ordinance of the Ministry of Education, Science and Culture No. 9 of 1953) as well as Article 47 and Article 70 of the National University Corporation Nagaoka University of Technology Rules (hereinafter, the "University Rules").

(Degree)

Article 2 (1) The University shall confer bachelor's, master's, and doctoral degrees.

(2) The name of the relevant major field shall be appended to the degree certificate in accordance with the following classifications.

Degree	Name of Major Field
Bachelor's Degree	Engineering
Master's Degree	Engineering
Doctoral Degree	Engineering

(Requirements for Degree Conferral)

Article 3 (1) The bachelor's degree shall be conferred to students who have graduated from the University.

(2) The master's degree shall be conferred to students who have completed a master's program at a graduate school of the University.

(3) The doctoral degree shall be conferred to students who have completed a doctoral program at a graduate school of the University.

(4) In addition to those prescribed in paragraph (3), the doctoral degree may also be conferred to persons who have passed the doctoral dissertation screening process conducted by the graduate school of the University and to persons who have been confirmed to have academic ability equivalent to or greater than a person who has completed a doctoral program at the graduate school of the University.

(Application for Thesis/Dissertation Screening, etc.)

Article 4 (1) When a student of a graduate school of the University applies for the screening of their thesis/dissertation, the student must submit the following documents to the President of the University (hereinafter, the "President") by the prescribed date.

(i) In the case of an application for master's thesis screening, the following documents are required: The designated application form for thesis screening and a master's thesis

(ii) In the case of an application for doctoral dissertation screening, the following documents are required: The designated application form for dissertation screening, a doctoral dissertation, an abstract of dissertation, and a list of papers

(2) The screening of the master's thesis prescribed in item (i) of the preceding paragraph may, when the President finds it appropriate after hearing opinions of the Faculty Meeting, be substituted with the screening of research outcomes on a specific topic.

(3) Applicants for the conferral of a doctoral degree under the provisions of paragraph (5) of the preceding article shall submit to the President the following documents: The designated application form for the degree, a doctoral dissertation, an abstract of dissertation, a list of papers, a curriculum vitae, and the dissertation screening fee of 57,000 yen. However, the dissertation screening fee shall be waived for students who have attended the doctoral program at the graduate school of the University for the designated number of years or more, obtained the required credits, had withdrawn from the program after receiving the necessary research guidance, and applied for doctoral dissertation screening within one year from the date of withdrawal.

(4) The submitted thesis/dissertation, etc. and the fee paid for the thesis/dissertation screening will not be returned.

(Thesis/Dissertation, etc.)

Article 5 (1) Only one thesis/dissertation, etc. shall be submitted for each applicant. Applicants shall submit one copy of the master's thesis or one item of the research outcomes on a specific topic, or one copy of the doctoral dissertation. However, other papers or results of research may also be submitted as supplementary materials.

(2) When it is deemed necessary for screening, the President may require the submission of translated versions of the thesis/dissertation, models, samples, or other materials.

(Screening Reference)

Article 6 After having accepted an application for the thesis/dissertation screening under the provisions of Article 4, the President shall refer the screening to the Faculty Meeting and hear their opinions related to conferral of the degree.

(Screening Committee)

Article 7 (1) When the screening is referred under the provisions of the preceding article, the Faculty Meeting shall establish a Screening Committee comprising three or more teaching faculty members in charge of the Graduate School of Engineering.

(2) When screening the thesis/dissertation or the research outcomes on a specific topic, the Screening Committee may, following discussion by the Faculty Meeting, obtain assistance from the teaching faculty, etc. of other graduate schools or research institutions.

(Screening, etc. of Thesis/Dissertation, etc.)

Article 8 (1) The Screening Committee shall undertake the screening of the thesis/dissertation or the

research outcomes on a specific topic, conduct final examinations, and confirm that the applicant has academic ability equivalent to or greater than a person who has completed the doctoral program in the graduate school of the University (hereinafter, "confirmation of academic ability") prescribed in the provisions of paragraph (4) of Article 3.

(2) Screening of the thesis/dissertation or the research outcomes on a specific topic shall be conducted in accordance with the criteria prescribed separately.

(3) The final examination shall be conducted as an oral or written examination, and shall focus mainly on the content of the thesis/dissertation or the research outcomes on a specific topic, on relevant subjects within the applicant's field of study, and when deemed necessary, on a foreign language subject designated by the Screening Committee.

(4) Confirmation of academic ability shall be conducted through an oral or written examination. In such cases, the evaluation of ability in a foreign language subject designated by the Screening Committee shall be administered.

(5) The final examination might be conducted instead of the confirmation of academic ability for students who fulfill the following criteria: students who have attended the doctoral program at the graduate school of the University for the designated number of years or more, obtained the required credits, had withdrawn from the program after receiving the necessary research guidance, and applied for doctoral dissertation screening within one year from the date of withdrawal.

(Screening Period)

Article 9 (1) The Screening Committee shall, in principle, complete the screening of the thesis/dissertation or the research outcomes on a specific topic, and conduct the final examination related to the application for the thesis/dissertation screening under the provisions of paragraph (1) of Article 4, during the period when the applicant is attending the University.

(2) The Screening Committee must complete the screening of the doctoral dissertation and the confirmation of academic ability related to the application for degree conferral under the provisions of paragraph (3) of Article 4, within one year from acceptance of the application. However, when there are special circumstances, the screening period might be extended following discussion by the Faculty Meeting.

(Report of Screening Results)

Article 10 After completing screening of the thesis/dissertation or the research outcomes on a specific topic, and the final examination or the confirmation of academic ability, the Screening Committee must immediately report to the Faculty Meeting with the following documents, along with the Committee's recommendations on whether or not the degree should be conferred.

(i) For a master's degree, the following documents are required: Screening results of the master's thesis or the research outcomes on a specific topic, and the results of the final examination

(ii) For a doctoral degree, the following documents are required: The abstract of the doctoral dissertation content, the abstract of the results of the dissertation screening, the screening results of the doctoral dissertation, and the results of the final examination or the abstract of the results

of the confirmation of academic ability

(Review of Degree Conferral)

Article 11 The Faculty Meeting shall review whether the degree should or should not be conferred based on the report described in the preceding article, and shall report the result to the President along with their opinions related to conferral of the degree.

(Conferral of Degree)

Article 12 Based on the opinions mentioned in the preceding article, the President shall confer the designated degree certificate to those on whom the degree should be conferred, and shall notify those who will not receive the degree.

(Publication of Doctoral Dissertation Abstracts, etc.)

Article 13 After having conferred a doctoral degree, the President shall publish the abstract of the dissertation contents and the abstract of the results of the dissertation screening via the internet within three months from the date on which the doctoral degree was conferred.

(Publication of Doctoral Dissertation)

Article 14 (1) A person to whom the doctoral degree has been conferred shall publish the full text of the dissertation within one year from the date on which the doctoral degree was conferred. However, this shall not apply if the dissertation has already been published before conferral of the degree.

(2) Despite the provisions of the preceding paragraph, for cases in which there are special circumstances, a person who has been conferred the doctoral degree may publish a summary of the contents instead of the full text of the dissertation with the approval of the University. In such cases, the University shall make the full text of the dissertation available upon request.

(3) The method of publication used by a person who has been conferred the doctoral degree under the provisions of preceding two paragraphs shall be that of online publication on the internet, in cooperation with the University.

(Title of Degree)

Article 15 A person who has been conferred a degree from the University shall append the name of the University when using the title of the degree.

(Report of Conferral of Doctoral Degree)

Article 16 After having conferred a doctoral degree, the President shall report conferral of the degree to the Minister of Education, Culture, Sports, Science and Technology within three months from the date on which the degree was conferred.

(Revocation of Degree)

Article 17 (1) When finding that a person who was conferred a degree has acquired the degree by dishonest means, the President shall, after hearing opinions of the Faculty Meeting, revoke the degree, have the degree certificate returned, and disclose the revocation of the degree.

(2) When a person to whom the degree was conferred is determined to have committed any disgraceful act upon the degree, the degree may be similarly revoked as described in the preceding paragraph.

Regulations of Handling of Thesis/Dissertation Screening of National University Corporation Nagaoka University of Technology

April 1, 2004
Regulations No. 28

(Purpose)

Article 1 These Regulations prescribe necessary matters related to the handling of thesis/dissertation screening based on the provisions of paragraph (2) of Article 8 and Article 19 of the National University Corporation Nagaoka University of Technology Degree Rules (hereinafter, the "Rules").

(Application for Thesis/Dissertation Screening, etc.)

Article 2 (1) An applicant for the screening of a master's thesis prescribed in paragraph (2) of Article 3 of the Rules or for the screening of a doctoral dissertation (hereinafter, a "course doctorate") prescribed in paragraph (3) of the same article shall submit the designated application form for thesis/dissertation screening to the President of the University (hereinafter, the "President") through the chair of the program or major after obtaining approval from the academic supervisor.

(2) An applicant for the conferral of a degree prescribed in paragraph (4) of Article 3 of the Rules (hereinafter, a "dissertation doctorate") shall submit the designated application form for the degree to the President through the chair of the major.

(3) The submission date for the application form for the thesis/dissertation screening in paragraph (1) shall be the date specified for each completion period.

(4) The application form for the degree in paragraph (2) might be submitted at any time.

(Submission of Thesis/Dissertation, etc.)

Article 3 (1) An applicant who submits the application form for master's thesis screening shall also submit documents specified in the table below to the President through the chair of the major after obtaining approval from the academic supervisor by the prescribed date.

Thesis or research outcomes on a specific topic	1 copy or 1 item
Summary of thesis or research outcomes on a specific topic (approx. 300 characters)	1 copy
Abstract of the thesis content or research outcomes on a specific topic (approx. 1,000 characters)	1 copy

(2) An applicant who submits the application form for dissertation screening of a course doctorate shall also submit the documents specified in the table below to the President through the chair of the program after obtaining approval from the academic supervisor by the prescribed date. An

applicant who submits the application form for the degree of a dissertation doctorate shall also simultaneously submit the documents specified in the table below to the President through the chair of the program.

	Course Doctorate	Dissertation Doctorate
Dissertation	1 copy	1 copy
Summary of dissertation (approx. 300 characters)	1 copy	1 copy
List of papers	1 copy	1 copy
Abstract of the content of dissertation (approx. 2,000 characters)	1 copy	1 copy
Curriculum vitae	1 copy	1 copy
Plagiarism Declaration Form for the Dissertation	1 copy	1 copy
Letter of Acceptance of Registration to the Institutional Repository	1 copy	1 copy
List of achievements	—	1 copy
Document certifying research experience	—	1 copy
Document certifying most recent academic background	—	1 copy

(Application Eligibility for Dissertation Doctorate)

Article 4 A person eligible to apply for the degree of dissertation doctorate shall be a person for whom any of the following items is applicable.

(i) Had withdrawn from the doctoral program of the graduate school of the University after attending the 5-year integrated doctoral program or a doctoral program for the prescribed number of years or more, obtained the required credits, and received the necessary research guidance

(ii) Has, in principle, a minimum of seven years of research experience after graduating from a university under the provisions of paragraph (1) of Article 83 of the School Education Law or who has, in principle, a minimum of four years of research experience after completing the first semester of a doctoral program or a master's program at a graduate school

(iii) Has research experience equivalent to or greater than that described in the preceding item

(Research Experience)

Article 5 The research experience in the preceding article shall refer to the experience that falls under any of the following items:

(i) Period of being engaged in research as a full-time university employee

(ii) Period of attendance at a graduate school for those who had withdrawn from graduate school

(iii) Other periods of experience recognized as equivalent to or greater than those in the preceding two items by the President after hearing opinions of the Faculty Meeting

(Screening Committee Composition)

Article 6 (1) The Screening Committee prescribed in Article 7 of the Rules shall be established for each application for thesis/dissertation screening, etc., and shall be composed of members comprising one chief examiner and two or more vice chair examiners.

(2) The chief examiner shall be a professor of the program. However, when the President finds it necessary after hearing opinions of the Faculty Meeting, the chief examiner might be an associate professor of the department.

(Candidates for Examiners)

Article 7 (1) After having accepted an application for thesis/dissertation screening, etc., the chair of the program shall compile a list of candidates for the Screening Committee and submit the list (hereinafter, the "candidate list for examiners") to the President after obtaining approval for the candidates at an academic major meeting. The list shall comprise the following:

(i) In the case of a master's degree application, three or more persons including the academic supervisor

(ii) In the case of a course doctoral degree application, five or more persons including the academic supervisor

(iii) In the case of a dissertation doctoral degree application, five or more persons

(2) Candidates for the examiners in the preceding paragraph may also include academic staff, etc. of other universities or research institutions as candidates for the vice chair examiners.

(Appointment of Examiners)

Article 8 The President shall appoint the chief examiner and vice chief examiners as the members of the Screening Committee prescribed in Article 7 of the Rules after having the Faculty Meeting review the candidate list for examiners and hear their opinions.

(Change of Examiners)

Article 9 When an appointed examiner cannot perform the thesis/dissertation screening as a result of unavoidable circumstances, the President may change the examiner after hearing opinions of the Faculty Meeting.

(Presentation of Thesis/Dissertation, etc.)

Article 10 (1) The chair of the program or major shall hold a presentation for the thesis/dissertation, etc. or the research outcomes on a specific topic submitted for the thesis/dissertation screening, etc. (hereinafter, the "presentation").

(2) The examiners shall attend the presentation in the preceding paragraph.

(Screening Criteria for Thesis/Dissertation, etc.)

Article 11 (1) The criteria for the screening of a master's thesis prescribed in paragraph (2) of Article 8 of the Rules shall be as described below.

Appropriateness of theme Selection	The selection of the theme for the thesis is appropriate and exhibits awareness of the related issues.
Academic Contribution	The thesis is sufficiently based on previous achievements in engineering and *Gigaku* (science related to technologies that further develop technological systems by reinterpreting diverse current technologies from a scientific aspect), and contains adequate logical considerations that are applicable to the theme for the thesis. The content is original and contributes to the development of engineering and *Gigaku*.
Appropriateness of Statements	Description of the thesis (e.g., text, figures, tables, and citations) is sufficient and appropriate, and possesses a consistent logical structure leading up to the Conclusion. The experimentally obtained results, etc. are consistent with the analysis and discussion.

(2) Criteria for the screening related to the research outcomes on a specific topic prescribed in paragraph (2) of Article 8 of the Rules shall be in accordance with the criteria of the preceding paragraph, with consideration devoted to the characteristics of the research topic.

(3) Criteria for the screening of a doctoral dissertation for a course doctorate or a dissertation doctorate as prescribed in paragraph (2) of Article 8 of the Rules shall be as described below.

Appropriateness of theme Selection	The selection of the theme for the dissertation is appropriate and exhibits the intent of writing the dissertation and the awareness of the issues.
Academic Contribution	The dissertation is sufficiently based on previous achievements in engineering and *Gigaku*, and contains adequate logical considerations that are applicable to the theme for the thesis. The content is original and contributes to the development of engineering and *Gigak*u that produces leading technologies.
Appropriateness of Statements	Descriptions of the dissertation (e.g., text, figures, tables, and citations) are sufficient and appropriate, and demonstrate a consistent logical structure leading up to the Conclusion. The experimentally obtained results, etc. are consistent with the analysis and discussion.

(Final Examination)

Article 12 (1) The final examination for the master's and course doctoral degrees prescribed in paragraph (3) of Article 8 of the Rules shall be conducted using the following methods:

(i) An oral or written examination focusing mainly on the content of the thesis/dissertation or the research outcomes on a specific topic, as well as on subjects related to the content

(ii) An oral or written examination of the applicant's foreign language ability as designated by the Screening Committee to ascertain whether or not a candidate possesses the foreign language skills necessary for completion of the master's or doctoral program

(2) The final examination in item (i) of the preceding paragraph might be substituted for the presentation.

(Confirmation of Academic Ability)

Article 13 (1) Confirmation of academic ability for a dissertation doctorate prescribed in paragraph (4) of Article 8 of the Rules shall be conducted using the following methods:

(i) An oral or written examination of subjects related to the dissertation content

(ii) An oral or written examination of the applicant's foreign language ability as designated by the Screening Committee to ascertain whether or not a candidate possesses the foreign language skills required for completion of the doctoral program

(iii) In addition to those specified in the preceding two items, an oral or written examination must be administered to confirm that students have an academic ability equivalent to or greater than a person who has completed the doctoral program

(2) Confirmation of the academic ability in item (i) of the preceding paragraph might be substituted for the presentation.

(Reporting of Screening Results)

Article 14 With regard to the reporting of the screening results to the Faculty Meeting prescribed in Article 10 of the Rules, the Screening Committee shall report these results following discussion at an academic major meeting.

(Review of Degree Conferral)

Article 15 When reviewing the conferral of a degree to a student prescribed in Article 11 of the Rules, the Faculty Meeting may require the attendance of the Screening Committee members as needed.

(Miscellaneous Provisions)

Article 16 In addition to the matters prescribed in these Regulations, necessary matters related to the handling of degree screening shall be addressed by the President after hearing opinions of the Faculty Meeting.

September 3, 1999

May 29, 2000 (Revised)

Approved by the Academic Affairs Committee

April 1, 2004 (Revised)

April 1, 2007 (Revised)

February 1, 2010 (Revised)

April 1, 2015 (Revised)

April 1, 2022 (Revised)

Agreement for the Administration of Academic Credits and Academic Achievements from Other Universities and Non-University Educational Institutions

The approval of academic credits earned from taking classes in other universities (including Nagaoka University of Technology [NUT]) (as provided by Articles 42 to 44 of the Rules of NUT) and other graduate schools (as provided by Articles 66 and 68 of the Rules s of NUT) and academic achievements from non-university educational institutions (hereinafter referred to as "credit approval") are as follows.

1. The credits and academic achievements eligible for credit approval are as follows:

i) Credits obtained from a university (including overseas universities) before admission to NUT or credits earned based on a credit transfer agreement.

ii) Academic achievements from non-university educational institutions before or after admission to NUT.

2. Students who intend to apply for credit approval (hereinafter referred to as "applicants") shall, in principle, submit the *Credit Approval Application Form* (Form 1) to the President of NUT during the first subject registration period after admission for the recognition of credits earned before admission, or during the subject registration period for the recognition of credits earned after admission. However, the conditions for credit approvals based on credit transfer agreements shall be provided separately.

3. For students who enroll into the third year of the undergraduate program, the number of transfer credits eligible for credit approval shall not exceed 30 credits (including credits earned before and after admission); the credit limit for each specific subject shall be determined by each program, major or the Language Center.

4. In cases of are applications as provided in paragraph (2), the President of NUT shall if deemed advantageous from an educational standpoint, approve the credits after consulting with the academic staff related to the relevant subject and after discussions with the Academic Affairs Committee and hearing opinions from faculty meetings.

2) The President of NUT shall notify the applicants regarding the results of the credit approval application through the *Credit Approval Notification Form* (Form 2).

3) The credit approval for subject used for major assignment shall be conducted through matching with corresponding NUT subjects.

4) Matters regarding the recording of approved subject names, number of credits, and performance evaluation to the results register are as follows:

i) Regarding subjects provided in paragraph (1), item (i), the relevant university name, subject name, credits, and performance evaluation shall be recorded.

ii) Regarding academic achievements as provided in paragraph (1), item (ii), the NUT subject name, credits, and performance evaluation of the approved achievements shall be recorded.

5) If NUT requires the raw numeric scores for graded assessments used in university performance evaluations, the minimum score for each particular grade shall be used. However, the raw numeric scores from the relevant universities shall be used for performance evaluations based on credit transfer agreements.

6) The criteria for credit approvals by the relevant program, major or the Language Center in charge of each subject shall be established after Academic Affairs Committee discussions.

(※Abbreviated Format)

Regarding Class Feedback Questionnaires

The class feedback questionnaires are for students taking the various types of classes (lectures, seminars, experiments/practical training). These questionnaires help to improve the classes by obtaining feedback from the students on each class. During the class period, there may sometimes be midterm questionnaires conducted, as well as attempts to improve classes as they progress. In addition, the questionnaire conducted before the final examination is used as a reference to make improvements to the class in the subsequent academic year. This questionnaire meant for you to answer how you feel about taking the subject as part of an educational program and the benefits you received during the class. The results of this questionnaire have no impact on your grade in the subject, so please give your honest opinions.

The items and points to be answered in the final questionnaire for Lectures are shown below. Please answer the questionnaires for Group Seminars and for Experiments/Practical Training in the same manner.

(1) Overall, do you think that the lectures were good?
Please answer whether you are satisfied with having taken this class.

(2) Do you think that the content of the lectures was well-planned and structured?
Please answer if you thought that the lectures were well-designed, if the selection of lecture topics was appropriate, and if the relationship between the topics was easy to understand throughout all lectures.

(3) Do you think that these lectures are important to the subject category (General Studies, Foreign Languages, Basic Engineering, Major Engineering electives, etc.) to which they belong?
By taking this class, were you able to obtain satisfactory learning results in the field of study that the subject category addresses (irrespective of whether it is a compulsory or elective subject)? The subject categories are as follows:
①General Studies (Basic Subjects) ②General Studies (Advanced Subjects) ③Social Activity Subjects
④Foreign Languages ⑤Basic Engineering Subjects ⑥Major Engineering Subjects
⑦Teaching Profession Subjects ⑧Graduate School Common Subjects ⑨Graduate School Major Subjects
⑩Special Subjects for International Students

(4) Did the lectures meet the expectations that you had before taking the subject?
Please answer if the actual lecture content were similar to your initial impressions and expectations for the subject (such as from the syllabus) that you had in the pre-class guidance session.

(5) Did you understand the objectives of the lectures as stated in the syllabus?
The objectives of each subject are stated in the syllabus. Please answer if you were aware of the class objectives before taking the classes.

(6) Did you achieve the objectives of the lectures?
Please answer if you think you have acquired the ability to meet the objectives of the subject by taking this class.

(7) How many hours did you spend outside of the classroom?
Please answer the total number of hours per week including time spent on preparation, review and homework, etc.

(8) Did the lectures help your learning?
Please answer if the class helped you gain a desire to learn, such as giving you a deeper understanding or a wider scope of interest.

(9) Were there any improvements to the class made as a result of discussions during the lectures?
Please answer if you think there was two-way communication regarding the classes, and if attempts were made to improve classes through the midterm questionnaire (if conducted), minute papers, and dialogues

during the lectures.

(10-1) With regard to the following items of the lectures, please select ones that you felt were particularly good. <u>You do not need to write anything for items that you felt were neither good nor bad or when it is not applicable.</u>

Please select items that you felt were particularly good. You do not need to write anything for items that you felt were neither good nor bad. As for Preparation of Teaching 1-3, please answer whether you felt prepared materials were good for the class or should be improved. You do not need to write anything when no materials were prepared in the class.

① Lecture content
② Lecture content scope and quantity
③ Lecture difficulty
④ Lecture progress
⑤ Lecturer's way of speaking, using microphone and clearly speaking
⑥ Use of blackboard/whiteboard/Power Point
⑦ Confirmation of students' understanding
⑧ Ease of asking questions
⑨ Preparation of Teaching Materials 1 (Documents for distribution, etc.)
⑩ Preparation of Teaching Materials 2 (PowerPoint, e-learning, etc.)
⑪ Preparation of Teaching Materials 3 (Models, actual materials, etc.)
⑫ Classroom facilities (Screen, projectors, etc.)

(10-2) With regard to the following items of the lectures, please select ones that you felt should be improved for future program. <u>You do not need to write anything for items that you felt were neither good nor bad or when it is not applicable.</u>

Please select items that you felt were unsatisfied or should be improved. You do not need to write anything for items that you felt were neither good nor bad. As for Preparation of Teaching 1-3, please answer whether you felt prepared materials were good for the class or should be improved. You do not need to write anything when no materials were prepared in the class.

① Lecture content
② Lecture content scope and quantity
③ Lecture difficulty
④ Lecture progress
⑤ Lecturer's way of speaking, using microphone and clearly speaking
⑥ Use of blackboard/whiteboard/Power Point
⑦ Confirmation of students' understanding
⑧ Ease of asking questions
⑨ Preparation of Teaching Materials 1 (Documents for distribution, etc.)
⑩ Preparation of Teaching Materials 2 (PowerPoint, e-learning, etc.)
⑪ Preparation of Teaching Materials 3 (Models, actual materials, etc.)
⑫ Classroom facilities (Screen, projectors, etc.)

(11) Please briefly write your specific comments and opinions on the lectures. (Open-ended)

Please answer freely with specific comments and opinions on the class. Please also give your comments, opinions, and suggestions related to the content and items of this questionnaire.

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