For Students Taking Liberal Arts and Common Subjects

Center for General Education

Toward the Realization of a Sustainable Society

In order to work in the real world where we face the various challenges of humanity, engineers are required to have a well-balanced combination of "well-rounded education" and "high-level professional skills."
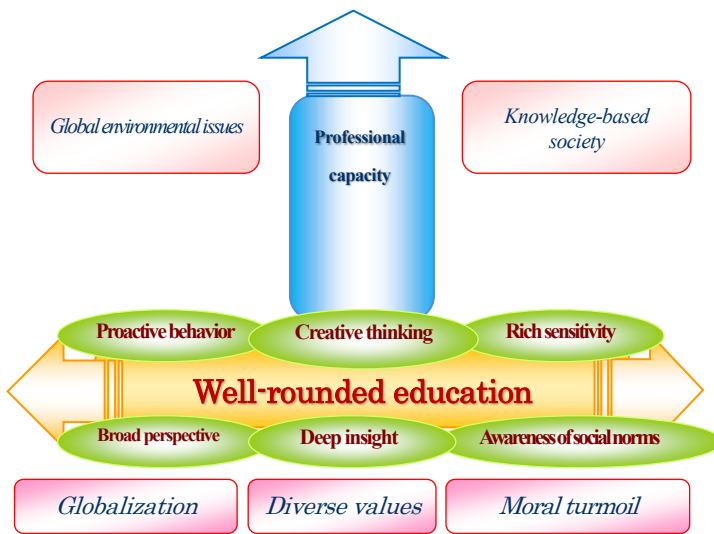

Figure 1: Importance of liberal arts education in today's society

- Various human activities have become increasingly complex and grown in scale, supported by science and technology. Additionally, globalization of every aspect of our lives is under way. This has given rise to the crisis of global warming, conflicts among diverse values, regional conflicts, and the threat of terrorism.

- In the 21st century, new knowledge and information technology are becoming increasingly important as the basis for activities in all areas of society. In this knowledge-based society, human beings are required to pool their wisdom, establish social morality, live in harmony with nature, and cooperate with the international community.

In these times, it is necessary to have a **well-rounded education that supports self-establishment by clearly indicating what new morals our future society, and the individuals who will live in it, will have.**

The liberal arts of the new age must enable us to develop an awareness of social norms and ethics, a rich sensibility, the ability to think creatively and to act independently, and physical and mental strength, in addition to a broad perspective and deep insight backed by knowledge. In general, we aim to cultivate and nurture a well-balanced combination of "intellect, virtue, and body" and "intellect, emotion, and will."

Liberal arts education is one of the two pillars of university education.

The enrichment of expertise is the primary focus of graduate school education, while undergraduate education puts emphasis on liberal arts and fundamental education in preparation for their specialization.

Liberal arts education not only provides a wide range of knowledge, but also cultivates the foundation of interpersonal and social skills.

Figure 2: Position of liberal arts education in universities

Our university aims to **foster highly-skilled engineers who will be leaders in their field** through an integrated education that spans six years from undergraduate to graduate levels (or four years from the third year of undergraduate school). We have put in place a **unique curriculum for** liberal arts education (including language education), which **enables students to acquire the following skills throughout these years.**

- Knowledge to understand the various circumstances surrounding technical science, including human beings, society, industry, and nature.

- Awareness of social responsibility as an engineer

- A variety of skills required for engineers in a globalized and information-oriented society

- Ability to constantly train and improve oneself amid important social changes

- Ability to explore new fields based on a deep understanding of natural science

- Skills required for leading high-level engineers in companies and society

Goals of Liberal Arts Education at the University: From the Perspective of Developing Leading High-Level Engineers

The university's liberal arts education aims to develop the following abilities (3 x 3) in leading engineers. The following is a list of goals and the corresponding subjects, so that you can take them systematically throughout your undergraduate and graduate studies.

Ability to create new ideas in technological science flexibly from many perspectives	A. Acquisition of the concepts and techniques of science, mathematics and data science that support technology
	B. Understanding technology from the perspectives of life, humanity, and society
	C. Ability to understand and conceive technologies that integrate multiple areas of expertise
Strategic technology management	D. Acquisition of language and logical thinking abilities that form the foundation of understanding, thinking, expression, and dialogue
	E. Ability to consider the effects of technology on safety, environment, and culture
	F. Ability to support penetration into global trends of society and industry and which support strategic technology management
Leading international engineer	G. Acquisition of the basic ability of technical communication in English
	H. Development of a cosmopolitan mode of thinking and the ability to cooperate on an international team
	I. Acquisition of the ability to engage in international competition in a fair manner as a leading international engineer

In particular, **in order to achieve the sustainable development goals (SDGs)**, we develop human resources in STEM (Science, Technology, Engineering, Mathematics → to train engineers capable of making effective use of data science and artificial intelligence (AI) and equipped with cross-disciplinary and interdisciplinary knowledge), STEAM (STEM + Art/Arts → to develop engineers capable of responding to social change from a broader perspective and demonstrating management skills), and other subjects in "Information," "Economics and Management," "Environment," and "Safety" categories. Related courses are indicated by color (compulsory subjects, elective-compulsory subjects, and recommended subjects) .

	Education Contents	Master's Program / GD1 / GD2	B3 / B4	B1 / B2
A	Mathematics Science AI, Mathematical & Data Science	Modern Mathematics Theory of Mathematical Analysis	Data Science A–EI/II	Exercise in Basic Mathematics 1,2 Basic Physics, Basic Chemistry, Basic Biology Introduction to Mathematical Modeling, Data Science, and Artificial Intelligence Information Processing
B	Life, Body and Technology Humanity and Technology Society and Technology	Sports Bio-mechanics Social Welfare Introduction of Cognitive Science Language and Thought Advanced Psychology	Sports Methodology for Total Fitness SDGs in the latest high performance sport science Introduction to Social Welfare Interactive System Design Introduction to Psychology Introduction to Design History of Art Theory of Art	Physical Education 1,2
C	Multidisciplinary Technology			
D	Power of Expression and Composition Reporting, Presentation and Debate Knowledge, Thought and Information		Japanese Technical Writing Logic and Thought Newspapers in the Information Age	Exercises in Japanese writing and speaking Exercises in Writing Research Papers Introduction of Information Retrieval Language and Communication
E	Technology and Safety Technology and Environment Technology and Culture Engineering Ethics	Advanced Safety Engineering Advanced Safety and Information Security 1 Advanced Safety and Information Security 2 Science and technology in modern society	Earth Environment and Technology Engineering Ethics	Introduction to Global Environmental Studies Life and Ethics
F	Economy and Management Industry and Entrepreneurship Innovation, Scientific and Technological Society Intellectual Property	Energy and Economy in Japan Advanced Business Management Practical work on venture flotation training 1 Practice of Idea Development Japanese Industrial Development and SDGs Gigaku Innovation and Creativity An outline of Intellectual Property	Macroeconomic Analysis Management Engineering Introduction to Marketing Business and Management Introduction to Management studies Regional Management Local Industry and Globalization History of Science History studies from technological perspective Special Lectures for GIGAKU Innovation 1、2 Technology Development and Intellectual Property Right	Micro Economics
G	English Reading and Writing Reporting, Presentation and Debate in English Business English for Engineers	Technological English English for Science and Technology English for Academic Purposes Analytical Reasoning and Presentation Professional Discourse and Presentation Fundamental English for Graduate Students English Presentation Skills		
H	Societies and Cultures in Japan and in the World Multicultural and Multilateral Understanding Teams, Leaders and Practical Skills	Language and Understanding of Other Culture Cross-cultural Mapping: Developing Your Cultural Awareness Characters in modern Japanese literature Social Skills Considering from Diversity Role of Creativity and Leadership Development in Enterprise and Business	Introduction to EU Cultural Affairs Society and Culture History of the East Japanese Modernization and Western Civilization Japanese Philosophical Development History of Cultural Exchange History of international relations of Japan Global Communication Foundation of Volunteer Activity Practical Volunteer Activity Working adults necessity learned from education within enterprise Practical ability developed through Go Engineering Design	History and Culture History of Social Developments Philosophy and Value Literature and Human Image Education and Learning Construction and Change in Modern Society
I	Law and Justice Organization and Problem Solving	Compliance of Corporation International Relations	Introduction to Legal Mind Politics	The Constitution of Japan and Modern Society
J	(Multiple contents)	SDGs -recognizing limitations and challenges Introduction to the SDG Practice	Introduction to the SDGs	

About the Curriculum

Undergraduate liberal arts subjects are categorized according to disciplines and subject levels as shown below.

Subject category	Target year of study	Number of subjects	Goals and examples of subjects or subject areas
(1) Basic Education Subjects	B1, B2	9	The aim is to acquire the fundamental skills to understand the various circumstances surrounding the technical sciences. The subjects consist of basic lectures and practical sessions in mathematics, physics, chemistry, and biology, exercises in Japanese language expression and report writing, and physical education.
(2) Basic Humanities Subjects	B1, B2	7	We provide students with a basic knowledge of human nature and ways of being, with a focus on cultural activities. The subjects include philosophy, ideas, history, literature, and pedagogy.
(3) Basic Social and Management Science Subjects	B1, B2	5	Students are encouraged to acquire basic knowledge, etc., to consider social systems, order, and social norms, with a focus on social and economic activities. The fields of study include law, economics, sociology, environmental studies, and informatics.
(4) Basic AI and Data Mathematics Subjects	B1, B2	2	The goal is to acquire basic knowledge in the field of AI and information technology that supports social, economic, and cultural activities. Students take courses such as AI and information processing.
(5) Advanced Humanities Subjects	B3, B4	14	In addition to learning advanced subjects in the humanities, students will cultivate their methods of thinking and expression, deepen their understanding of various cultures, and develop the ability to play an active role in international society. Courses include art and design, cultural theory, media theory, and psychology.
(6) Advanced Social and Management Science Subjects	B3, B4	10	In addition to taking subjects in advanced social and management science, students will develop the ability to apply technical science to society and to explore new technical science fields that society needs. This includes political science, business administration, intellectual property rights, and social welfare.
(7) Advanced AI and Data Mathematics Subjects	B3, B4	6	In view of the basic understanding of AI and information technology, students acquire the knowledge and skills to apply these technologies in their specialized fields through data science subjects in each field.
(8) Interdisciplinary Subjects	B3, B4	13	We aim to foster creativity and practical skills to develop new fields of technical science through complex and interdisciplinary approaches. The courses cover engineering ethics, global environment and technology, history of science, health and sports science, and cognitive science.
(9) Fundamental Social Activity Subjects	B3, B4	2	Students are expected to be aware of their responsibilities as members of society, and to acquire practical knowledge regarding volunteerism and business skills, which will be the basis for being proactively involved in social activities.
(10) Practical Volunteer Activity Subjects	All students	1	Students cultivate independence, proactivity, and the ability to find and solve problems by contributing to society through volunteer activities.

Figure 3: Curriculum for Liberal Arts and Common Subjects in Undergraduate and Graduate Schools (dotted lines indicate subject groups not covered in these subject categories)
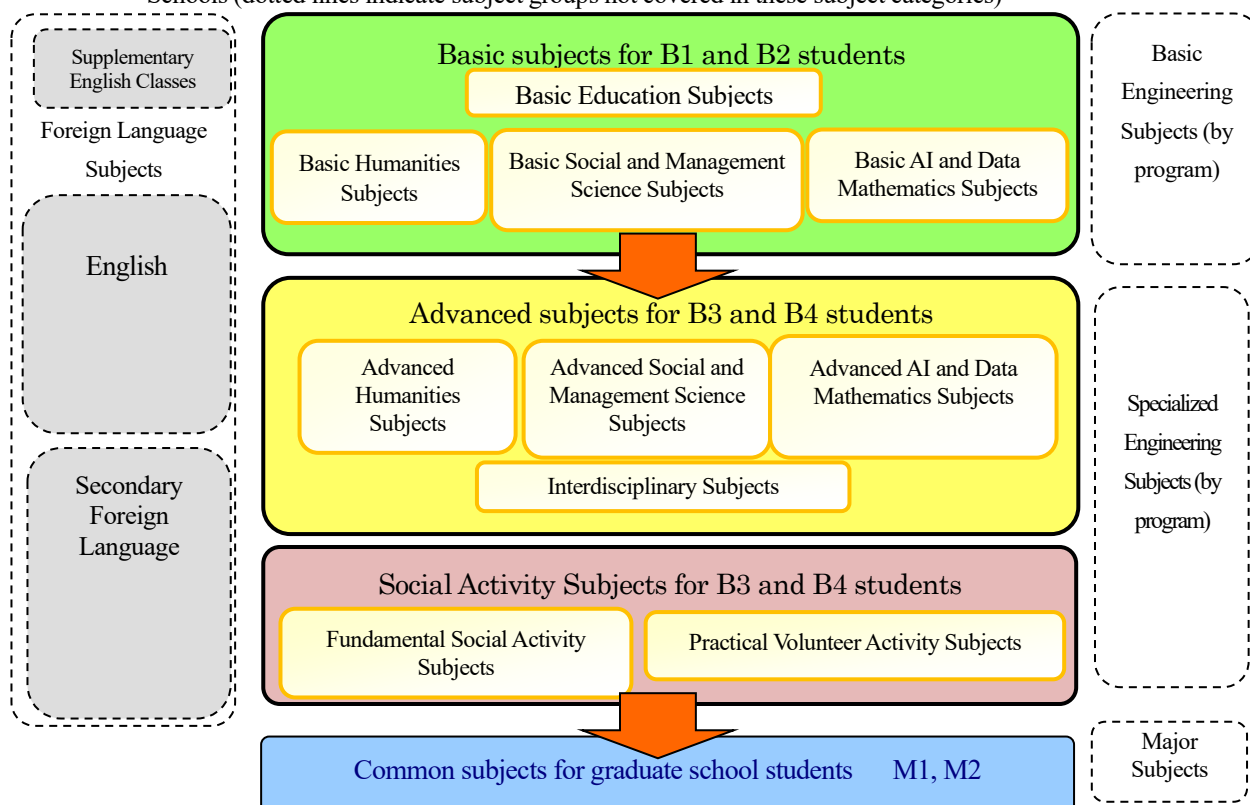
B1, first year undergraduates; B2, second year undergraduates; B3, third year undergraduates; B4, fourth year undergraduates; M1, first year Master's students; M2, second year Master's students

Advice for Liberal Arts and Common Subjects

For newly enrolled first-year undergraduates

○ **Number of credits from Liberal Arts Subjects that must be earned during B1 and B2**
Students must earn 14 credits from Basic Subjects.

○ **"Physical Education 1" and "Information Processing" are compulsory subjects in B1 and B2**
"Physical Education 1" is offered during the first semester of B1, and "Information Processing" is offered during the first semester of B2.

○ **Students who are uncertain about their fundamental abilities in science, mathematics, and Japanese language should focus on Basic Education Subjects**
A maximum of 4 credits will be accepted as graduation requirement credits from subjects on basic mathematics, physics, chemistry, biology, and Japanese language (1 credit each); as well as from "Physical Education 1" (compulsory) and "Physical Education 2".

For newly enrolled / advancing third-year undergraduates

○ **Number of credits from Liberal Arts Subjects that must be earned during B3 and B4**
Students must earn 14 credits from Advanced Subjects and Fundamental Social Activity Subjects.

○ **"Engineering Ethics" and "Data Science" are compulsory subjects in B3 and B4**
"Engineering Ethics" is offered during the first semester of both B3 and B4. In addition, each department will have a designated subject for "Data Science A–E I / II", and their schedules will vary.

For newly-enrolled / advancing first-year and third-year undergraduates

○ **Notes for taking elective-compulsory subjects on economics and management**
Students must earn 2 credits (1 subject) from subjects on economics and management before graduation. The university offers one Basic Subject and six Advanced Subjects. Please note that there are restrictions on taking these subjects. For example, students cannot take the subjects outside of the target year of study. Students should refer to the "Undergraduate Program Guide" and check the content of each subject, consider which year and term is most appropriate for them, and ensure that they take one of these subjects.

○ **When selecting subjects, consider taking a multifaceted and balanced course of study**
Students should be aware of the abilities they need to acquire at university for their own future, and select a good balance of subjects from each category.

○ **Plan a course of study that includes intensive lectures**
In addition to conventional subjects with weekly classes, the university also offers intensive lectures that are held according to the schedules of guest lecturers. When planning a course of study, students should consider earning credits through weekly subjects as their foundation while also utilizing these intensive lectures.

○ **B1/B2 students can take subjects offered in B3 and B4, and B3/B4 students can take subjects offered in B1 and B2**
Students may take Advanced Subjects and Fundamental Social Activity Subjects during B1/B2, and may also take Basic Subjects during B3/B4 if they receive permission from the lecturer-in-charge of each subject (however, this does not apply to subjects on economics and management). Such credits earned during B1 and B2 will not be included in the 14 credits required to advance to B3. However, after advancement, these credits (maximum of 4 credits, excluding Basic Education Subjects) can be counted in the 14 credits that must be earned from Liberal Arts Subjects during B3 and B4.

○ **Actively participate in practical volunteer activities**
In today's society, various social activities are increasingly supported by volunteers in NPOs and NGOs. Furthermore, there is a growing tendency for volunteer activities to be well regarded by society, including at employment examinations. The university enables students to earn credits for their participation in organized volunteer activities (not applicable as graduation requirement credits). In principle, subject registration is conducted at the start of each academic year. However, disaster recovery volunteer activities can be retrospectively registered after participation.

For newly enrolled first-year Master's/Doctoral (Technology Innovations) students

○ **Number of credits from Common Subjects that must be earned during the first and second years (Master's/Doctoral [Technology Innovations] Program)**
All Common Subjects (excluding subjects for course students) are elective, and students must earn a minimum of 6 credits from these subjects. (Working adult students enrolled in System Safety Engineering can substitute these with Specialized Subjects.)

○ **Credits can be earned for overseas experiences involving educational and research activities**
"Cross-cultural Mapping: Developing Your Cultural Awareness" is a 2-credit subject that assesses the content of overseas experiences spanning a total of two months or more. For this subject, students must attend three lectures (intensive) and submit a preliminary report before departing for the overseas experience. Students intending to earn credits for this subject should take these lectures in advance. The subject schedule will be posted.

For all undergraduate and graduate students

○ **Note that some subjects may limit the number of registered students through a lottery**
Some subjects limit the number of registered students in order to ensure high educational standards and class control. Students should check these lottery-based subjects on the bulletin boards, and apply for the lottery when registering for subjects.

○ **Acquisition of Teacher's License Certification**
Please ask the Section of Educational Exchange of the Division of Academic Affairs.

Center for General Education https://www.nagaokaut.ac.jp/center/cge/index.html