

Top Global University Project (Type B) Nagaoka University of Technology

1. Outline

【 Name of project 】

The Education Program for Innovative Global Engineers

~Toward development of an integrated global campus with collaboration between industry, academia, and government~

【 Future vision of the university planned in TGU project 】

The university leading the Innovative Global Engineering Education with a strong network among world-leading strategic regions in the next-generation.

【 Summary of Project 】

This project is intended to realize “the university leading the Innovative Global Engineering Education with a strong network among world-leading strategic regions in the next-generation” as the status of Nagaoka University of Technology in ten years through the following projects that will be its pillars, looking hard at the future vision of globalization for the Japanese economy.

1. Promoting KOSEN-University of Technology (GIGAKU) Education and Research Model at the next-generation strategic regions and establishing **GIGAKU Education and Research Network**.

2. Promoting Industry-Academia Cooperation Model at overseas strategic regions and establishing **GIGAKU Techno Park Network**.

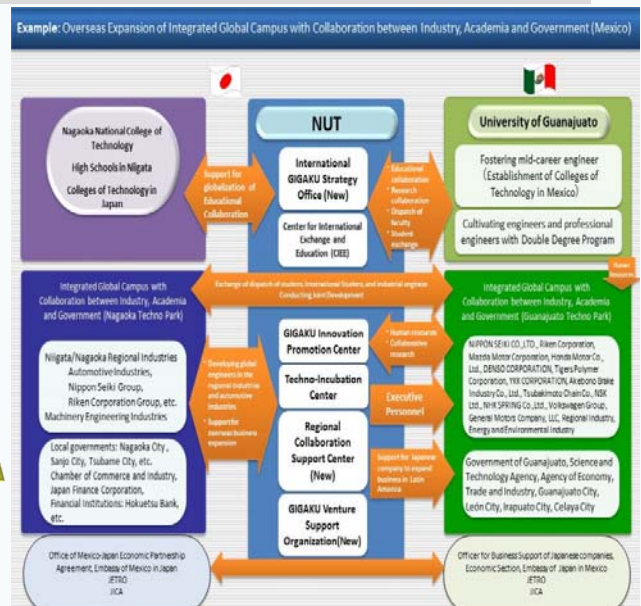
3. Promoting the world-class level research at the technology field that meets the needs of global society.

The keyword here is **GIGAKU = science of technology, which has remained the fundamental philosophy of Nagaoka University of Technology since its foundation** and which has started to attract attention from overseas partners again during the course of NUT expansion in global activities. The idea aims to realize a GIGAKU Education Model, which is attracting global attention, at base universities in strategic regions, particularly for Japan. The global education environment created in this way is simultaneously indispensable for Japanese students to develop as creative engineers who play active roles in the era of new globalization. The ultimate goal of the idea lies also in this point.

(Outline Figure etc.)

Integrated Global Campus with Collaboration between Industry, Academia, and Government

「 GIGAKU Education and Research Network 」 + 「 GIGAKU Techno Park Network 」
= 「 Integrated global campus with collaboration between industry, academia, and government 」



【Summary of the 10-year plan】

○ Program for **cultivating practical global engineers**

To develop science and technology education and research programs for cultivating practical engineers worldwide, we are implementing a range of collaboration programs for undergraduate students to doctoral course at overseas base schools to promote the improvement and expansion of settings with companies.

○ Support for **spreading education of science and technology in overseas base school**

To collaborate with universities in strategic areas throughout the world and to spread education based on science and technology, we aim to support program inception and instruction of training methods. We also aim to establish extension campuses overseas in the future.

○ Integrated global campus developing with **GIGAKU techno park network**

We aim to construct an Integrated global campus at each strategic area by combining industry-university-government cooperation projects and science and technology practical education through Techno-parks that have been developed globally. Especially, we intend to develop international joint research, put research seeds into effect, apply the results to product development, and promote multiple dispatch of students of universities, technical colleges and high schools, SME engineers, and faculties.

○ **Industry-academia collaboration research projects in each strategies country**

With our ability to develop industry-university research, we investigate national and international companies' needs and technological innovation to realize industrial innovation through global application research, we construct and operate a new system for cultivating global engineers as valuable human resources.

○ **Promoting interactive student and faculty exchange**

Students and faculty members in NUT experience innovation with global enterprises utilizing global integrated campus of industry-university-government in an overseas base. This type of education fosters engineering with a certain general foundation for expertise and high power of execution for solving problems by introducing practical training methods into long-term education for 15-year-old high school students to the masters (or doctoral) level.

【Featured initiatives (Internationalization, University reform, Education reform)】

○ **Forty percent of students will experience innovation abroad by the time they complete the master's program**

Utilizing the recipients for overseas internship that NUT has cultivated and the GIGAKU Techno Park, we enable students to experience innovation abroad at each phase of college of technology, or KOSEN, faculty (internship), and graduate school (research exchange).

○ **The ratio of international students is to be increased to 25% by the transfer of the KOSEN model and the twinning program**

NUT supports overseas transfer of the KOSEN-style education model, which has drawn global attention, and secures international students from various backgrounds.

With the implementation of these efforts, students of NUT and GIGAKU Education Network will be provided a new learning opportunity through GIGAKU Techno Park Network. Moreover, the **Overseas Cross (Interactive) Internship** will be realized.

Nagaoka University of Technology established the **International Graduate Course for Continuing Professional Development** in 1994 and began accepting engineers who work for Japanese-affiliated and other companies to the master's program. The program is still the only **program in Japan as an engineering education course that targets working adults and which provides all lectures and research guidance in English**. In addition, NUT has made achievements such as having **dispatched 600 students to a total of 20 countries for a long period of six months as interns since 1990**. We have implemented widely diverse programs, always reviewing the future vision of globalization.

This project is to develop NUT's consistent philosophy and assets in educational programs while adding new elements, thereby responding quickly to new stages of globalization.

2. FY2014 Progress

■ Common indicators and targets

Internationalization

○ The Five-year Integrated Doctoral Program “Department of Science of Technology Innovation” has been established.

All lectures in this major are presented in English. NUT develops world-class personnel using the system, which enables students to study abroad for more than six months, and the double degree system, which enables them to earn a doctoral degree concurrently at an overseas university. In 2015, nine members of the inaugural class are enrolled and are aiming to become excellent leaders for industries in Japan and the world.

○ Clerical staff members are also making efforts for globalization.

NUT implemented training to develop English language ability for clerical staff. The improvement of language proficiency among clerical staff is necessary to address international students and clerical work with universities with which an academic exchange agreement was signed. We continue to implement practical training with actual business operations in mind.

○ NUT is improving the provision of information to overseas countries and the environment in which international students can easily study and undertake research.

NUT renewed its English site to enhance its contents and provide substantially equivalent information to that of its Japanese site. In addition, English has been added to the menus in the student cafeterias, making it easier for international students and teachers to place orders. We began offering halal and vegetarian meals; the environment has become more comfortable for students from diverse cultural and religious backgrounds.

University reform

○ Systems at NUT were improved to realize an “Integrated Global Campus with Collaboration between Industry, Academia, and Government.”

NUT reorganized the teacher organization that had been composed of nine “departments” into two teacher organizations as “research institutes” in April 2015. The reorganization activates research by combining different fields more actively. Furthermore, toward overseas expansion of GIGAKU education, we improved the systems of personnel and facilities that are intended to be the basis by establishing subcommittees on International GIGAKU Education Promotion, International Education and Research Network, International Techno Park Network, International Regional Collaboration Promotion, and Internationalization on Campus.

○ For the improvement of education at NUT, various hiring methods were implemented to produce excellent teachers in various fields.

[Annual Salary System]

To hire internationally excellent researchers actively, NUT appointed eight teachers under the annual salary system.

[Cross Appointment System]

To secure practical human resources in industries, we have newly employed two teachers in March 2015 using the cross-appointment system.

Education reform

○ To support international students, syllabus-related documents were translated into English.

To provide syllabus-related information equally for international students who have difficulty understanding Japanese language, the 2014 and 2015 syllabus presentations were translated into English. In addition, course registration guides and class timetables were posted on the English site. NUT is promoting support for international students by transforming the education system to a bilingual system.

○ Instructional software was introduced to enhance English language ability among students.

NUT has introduced instructional software to enhance English language proficiency among NUT students. We continue to foster practical, global human resources through further enhancement of the students’ ability to promote overseas practical training and internships actively. In 2014, 58 students participated in overseas internships.

○ Each education system is being improved.

To check the rules of subject numbering, to improve class contents and methods, and to examine the substantiation of credits, we have decided to introduce a class questionnaire system and have improved the environment.

Furthermore, to systematize the curriculum and construct an academic affairs system that secures the international interchangeability of credits based on international collaboration between KOSEN and universities of technology, we have conducted translation of the model core curriculum into English and have prepared to ensure the continuity of GIGAKU education with KOSEN established at overseas countries.



〈 The First GIGAKU Techno Park Alliance Meeting 〉

■ University's own indicators and targets

○ **Teacher diversity and mobility are being promoted through exchanges between the bases at home and abroad.**

Through GIGAKU Education and Research Network, NUT has been actively promoting the acceptance of young teachers from partner universities into our International Graduate Course for Continuing Professional Development and other courses. The number of partner university teachers who earned a degree at NUT has increased to **180** from about 150 at the end of 2013.

○ **NUT supports and develops international joint research involving local small and middle-sized enterprises.**

In Mexico, NUT has received applications for industry–academia joint research from **two local firms**. NUT is starting to devote specific consideration to them.

○ **NUT is conducting investigation and coordination to expand GIGAKU education to each base country. [Mongolia]**

Toward starting of the twinning program with Mongolian University of Science and Technology, NUT is carrying out coordination to improve the curriculum at Mongolian University of Science and Technology. In addition to dispatching teachers in charge to the site to investigate the conditions of coordination of the curriculum, implementation of lectures, and maintenance of laboratory equipment, we invite partner university teachers to visit laboratories and exchange opinions and to provide information that is expected to be useful for education and the enhancement of equipment in Mongolia. We have been striving to strengthen our mutual collaboration.

[Vietnam]

For the curriculum of **Vietnam Japan International Institute for Science of Technology (VJIIST)**, as established in Hanoi University of Science and Technology, to be equivalent to GIGAKU education at NUT, we dispatched and accepted teachers to coordinate the curriculum and other matters.

[Sri Lanka]

We **met face-to face with Sri Lankan President Mr. Ranil Wickremesinghe** and obtained his approval for the spread of GIGAKU education in Sri Lanka and an idea for the establishment of a new university to foster practical engineers based on GIGAKU.

■ Featured initiatives based on the characteristics of the university

○ **Super GI-net, a video conferencing system connectable to multi points in overseas bases, was installed.**

NUT installed Super GI-net, a video conferencing system that can support lectures and meetings by connecting multiple locations, at **University of Guanajuato (three campuses), Universidad de Monterrey, Hanoi University of Science and Technology, and Mongolian University of Science and Technology**.

In May 2015, the first Super GI-net Conference was held with participation from the four bases of UG, HUST, MUST, and NUT. An official from the Ministry of Industry and Trade of Mongolia explained the industrial circumstances in Mongolia at the conference, where we were able to share information among bases.

○ **GIGAKU Techno Park Office have been opened in three bases.**

NUT has opened offices in **Guanajuato Techno Park, Mongolian University of Science and Technology, and Hanoi University of Science and Technology** as overseas bases (GIGAKU Techno Park). In addition to inviting local people involved to the opening ceremony for each office to strengthen collaboration, we hired coordinators to start industry–academia activities. We were able to form the bases to construct a system to strengthen collaboration with NUT.

○ **GIGAKU Techno Park Alliance Meeting was held.**

“The First GIGAKU Techno Park Alliance Meeting” was held in Nagaoka City on March 23 and 24. We invited 21 working-level personnel from six countries to convene a study meeting and an exchange of opinions related to the Techno Park. In that successful meeting, **a total of 45 people** participated, including those involved in business enterprises. Lively discussions were held with the goal of constructing a future “GIGAKU Techno Park Network.”

■ Free description

○ **GIGAKU Global Network Promotion Office, which is intended to be a base for the dissemination of information in and out of NUT, was established.**

We established **GIGAKU Global Network Promotion Office**, which is to be a base for the dissemination of information mainly on Top Global University Project in and out of NUT. The office will be used for the dissemination of results as well as the holding of meetings with people of overseas base universities and promotes the globalization of NUT.

○ **NUT is holding consultations with base countries to promote overseas assignment of Japanese students and the acceptance of international students.**

In 2014, we improved the basis for promotion of overseas dispatching of Japanese students and for the acceptance of international students by encouraging companies to accept new interns in Thailand and Indonesia and to hold positive consultations related to the double degree program with universities in Malaysia and Thailand.

3. FY2015 Progress

■ Common indicators and targets

Internationalization

○ Environment Created to Deal with International Students, Foreign Teachers, and Visitors from Overseas Universities and Institutions

Many of the signs posted in NUT have been written in both Japanese and English.

In addition, English training was provided for 14 clerical staff members twice a week. Overseas SD training was provided for four people.

[**Number of clerical staff members who meet the standards for foreign languages (as of the end of March, 2016)**] Number of full-time staff: 21. Number of part-time staff: 8

○ Foundation of Short-term Acceptance Program for International Students Promoted by Establishment of International Cooperation Associate

International Cooperation Associate considered programs to accept international students and supported the conclusion of academic cooperation agreements to address the increasing number of international students.

Nagaoka Summer School for Young Engineers (NASSYE)

has been planned as a short-term study abroad program for overseas university students. It will accept 20 students in the summer of 2016.



University reform

○ Internationalization of Teachers Promoted through International Public Offerings of Teachers and Enhancement of Sabbatical Training System

As a result of an international public recruitment of teachers via the English version of our university's home page, a foreign teacher has been employed in the Department of Materials Science and Technology. In addition, the sabbatical training system was enhanced and a young female teacher has been dispatched to Germany for about a year. Every time a debriefing session is conducted by a person who experienced the sabbatical training, it attracts numerous teachers and other staff.

As described above, the internationalization of teachers is being promoted by improving the methods of public offering to secure excellent foreign teachers and by actively dispatching young Japanese teachers abroad.

○ Institutional Research (IR) Promotion Office Established to Enhance Function of IR

With the change of the administration, we have added a vice president in charge of institutional research, evaluation, and public relations and a presidential aide in charge of IR and evaluation. In April 2016, the IR Promotion Office was established.

Enhancement of IR functions will help gather and analyze various information within and outside the university and use it for further enrichment of global strategies and education.

Education reform

○ Subject Numbering System to be Introduced in 2016

The system helps students to choose and take appropriate subjects according to the levels and specialized characteristics of the subjects. In the future, it might be used for tasks such as the comparison of class levels with those of other universities and technical colleges and work for comparison of curricula.

■ University's own indicators and targets

○ Overseas Internship and Overseas Cross Internship Systems Expanded

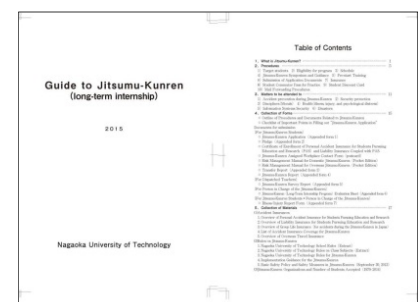
The **English version of "Guidance for Internships"** was made to visit overseas companies accepting internships, etc. We are promoting the cultivation of new recipient companies.

In addition, the dispatch of overseas internship students to the Basque Country, Spain and the acceptance of international students from Mondragon University in the Basque Country started in 2015.

Overseas cross internships are also being expanded to various countries.

For example, students of both universities undergo corporate training in the country to which the students were dispatched.

In 2015, overseas cross internships were implemented with universities in India, Malaysia, and Spain.



〈English version of "Guidance for Internships"〉

○ GIGAKU Techno Park provides continuous support for globalization of SMEs

[Vietnam] A workshop held jointly with Hanoi University of Science and Technology attracted more than 100 participants from universities and companies.

[Thailand] A joint symposium was held with Chulalongkorn University (4th Joint Symposium CU-NUT&CU-NUT GIGAKU Techno Park Office), in which 80 people from universities and companies participated.

[Mexico] Researchers of University of Guanajuato visited a Querétaro factory of a Japanese-affiliated, SME via the GIGAKU Techno Park of NUT and exchanged opinions on future joint research.

We invited participating companies to an innovation forum held in Guanajuato State.

As described above, we continue to promote the international expansion of SMEs using the GIGAKU Techno Park.

■ Featured initiatives based on the characteristics of the university

○ Twinning Program with Mongolian University of Science and Technology Starts

To develop human resources in engineering to meet requests of the industrial community in Mongolia, a Twinning Program with Mongolian University of Science and Technology started. At the start, we gave the training for teachers and staff invited from the Mongolia side, in addition to adjusting the curriculum, as the secretariat school of the Japanese University Consortium universities (Kitami Institute of Technology, Nagoya Institute of Technology, Toyohashi University of Technology, Kyoto Institute of Technology, Kyushu University, and Nagaoka University of Technology).

In September 2015, **the Opening Ceremony of Twinning Program in Mongolia** was held with many people present, including the Minister for Education, Culture and Science of Mongolia (a graduate of NUT), Japanese ambassador plenipotentiary to Mongolia, and attendees from universities and technical colleges. The first half of education for the first graduates students started.

○ Two New GIGAKU Techno Park Offices Established

As overseas bases (GIGAKU Techno Park), a joint office was newly established in **Chulalongkorn University in the city of Bangkok, Thailand and Universiti Sains Malaysia in Penang Island, Malaysia**, respectively. A coordinator is stationed in each office to promote cooperation with Japanese-affiliated companies. The offices are the fourth and fifth offices, following those of Mongolia, Vietnam, and Mexico.



〈 GIGAKU Techno Park Office in Thailand 〉

■ Free description

○ Fourth International GIGAKU Conference in Nagaoka Held

To disseminate the spirit of “GIGAKU” throughout the world, NUT has held the **International GIGAKU Conference** every year since 2011. The year of 2015 marked its fourth anniversary, in which a total of about 520 teachers, staff, researchers, and students, including 56 attendees from 13 foreign countries participated.

At the conference, our distinctive “KOSEN–University of Technology Education System” (GIGAKU education) was explained and opinions were exchanged on widely various areas, such as matters related to international joint research. The fifth conference will be held in October 2016.

○ Support for Education and Research Using Video Conferencing System Provided

A video conferencing system (Super GI-net) introduced at overseas bases is being used for education and research at Nagaoka University of Technology and base schools.

[Super GI-net Conference Held between Japan, Mexico, Vietnam, and Mongolia] Teaching staff of the bases and coordinators of the Techno Park offices exchanged opinions on the actual conditions and situations of each country in terms of industry–academia cooperation and international cooperative education, and shared the problems to be solved.

In addition, coordinators of the Techno Park offices exchange information on a regular basis using the Super GI-net.

[Seminars between Mongolian Office and NUT Laboratory Start]

Laboratory of Civil and Environmental Engineering at NUT and the laboratory at Mongolian University of Science and Technology hold seminars once a week using the Super GI-net.

[Debriefing Session by Internship Students Dispatched to Mexico Held]

Using the Super GI-net established at the University of Guanajuato, Mexico, a debriefing session was held with our students on overseas internship.



〈 4th International GIGAKU Conference in Nagaoka 〉