

1. A Schematic of the Entire Concept

Creative Campus for Nurturing “Global Technology Architects”

Our philosophy and human resource development mission:



Master Technology, Create Technology

Nurturing practical, creative, and leading engineers

Cutting edge technology research to kick off the next generation

- Nurturing industry leading engineers and researchers by means of a combined undergraduate and graduate school education system centered on technical college graduates
- Education based on a spiral approach in which the fundamentals, specifics, and applications repeatedly reinforce each other along with practical training
- Dispatching students overseas (internships, etc.), accepting international students, international joint research, and researcher exchanges utilizing the overseas education base in Malaysia

■ Types of human resources we aim to nurture ■

- ✓ Global Communication Capability
 - Ability to understand and express oneself amidst diverse value sets with superior language skills and open-mindedness toward different cultures
- ✓ Problem solving skills in a global context
 - The ability to realize ideas as well as grasp, analyze and solve problems, based on scientific knowledge and superior technical capabilities
- ✓ Interpersonal skills applicable globally
 - Cultural awareness, a willingness to take on challenges, plus leadership ability tempered by a flexible and tolerant spirit of cooperation



Global Technology Architects

■ Initiatives under this concept ■

Global Technology Architects Course

■ Leading the way towards the goal of bilingual classes in all courses ■ [95% bilingualism throughout the university]

- A combined 6-year undergraduate and graduate school, residential program, special training course, bilingual (English-Japanese) lectures
 - 290 students in total (140 Japanese graduates of technical colleges, 60 international graduates of technical colleges, 90 international students)
 - AO entrance exam English [TOEIC score of 550 or equivalent], appraisal of global orientation, local entrance exams for international students
- Development of globally applicable problem solving skills and an enhanced cultural awareness
- Six months of overseas (must be a country where students are non-native speakers) practical training internship requisite
- The strategic utilization of Toyoashi University of Technology's Penang School in Malaysia and the strengthening of collaboration with partner schools overseas
- Global language skills [TOEIC score of 730 or equivalent and Japanese language proficiency test N1 or equivalent for international students required to graduate]

Multicultural Boarding House

■ Multicultural environment on campus to spur globalization ■

- Residential shared boarding house for course students (capacity: 200 people). Students of many nationalities using English as their common language
 - Permanently-stationed house masters and residents' assistants, learning support and global event planning
- A special zone for developing interpersonal skills applicable globally, creating a multicultural environment on-campus to spur globalization
 - Integrated with existing dormitories for a total of 800 people [36% of all the students eat, live, and study together, 25% being international students]

Global capability upgrade of all students, faculty and university staff

■ Making the various tiers of human resources on campus multinational and strengthening international compatibilities ■

- Students
 - Increase mobility of credit transfer for JD/DD international students by making all lectures bilingual. Steadily increase the ratio of international students by boosting the internship system [Target international student percentage: 23%]
 - Overseas practical training and the increase of internships [overseas implementation percentage: 30%]
- Faculty
 - The acceleration of mid-to-long term overseas research education with the systematic implementation of personnel exchanges, training, and research unit exchanges, etc.
 - [Joint international research paper percentage: 30%; TOEIC 730 points or higher: 50%]
- Administrative staff
 - The acceleration of mid-to-long term internships and training by means of systematic and successive personnel exchanges with partner schools overseas [14 days+ experience: 38%; TOEIC 600 points or higher: 27%]

Combined undergraduate and graduate school education / technical college collaboration / practical training internship / spiral-approach education

Internal collaboration / international exchange / industry-academia-government collaboration / local community collaboration

Distinguished scientist and engineer training program / Tailor made exchange zone education program

International programs Master's Degree, Doctoral Degree, Master's Twinning, Master's Double Degree

Leading Graduate School Program

Doctoral Degree Program for training Brain Information Architects

Enhancement of Research Universities Program

Electronics advanced integrated research and RAC

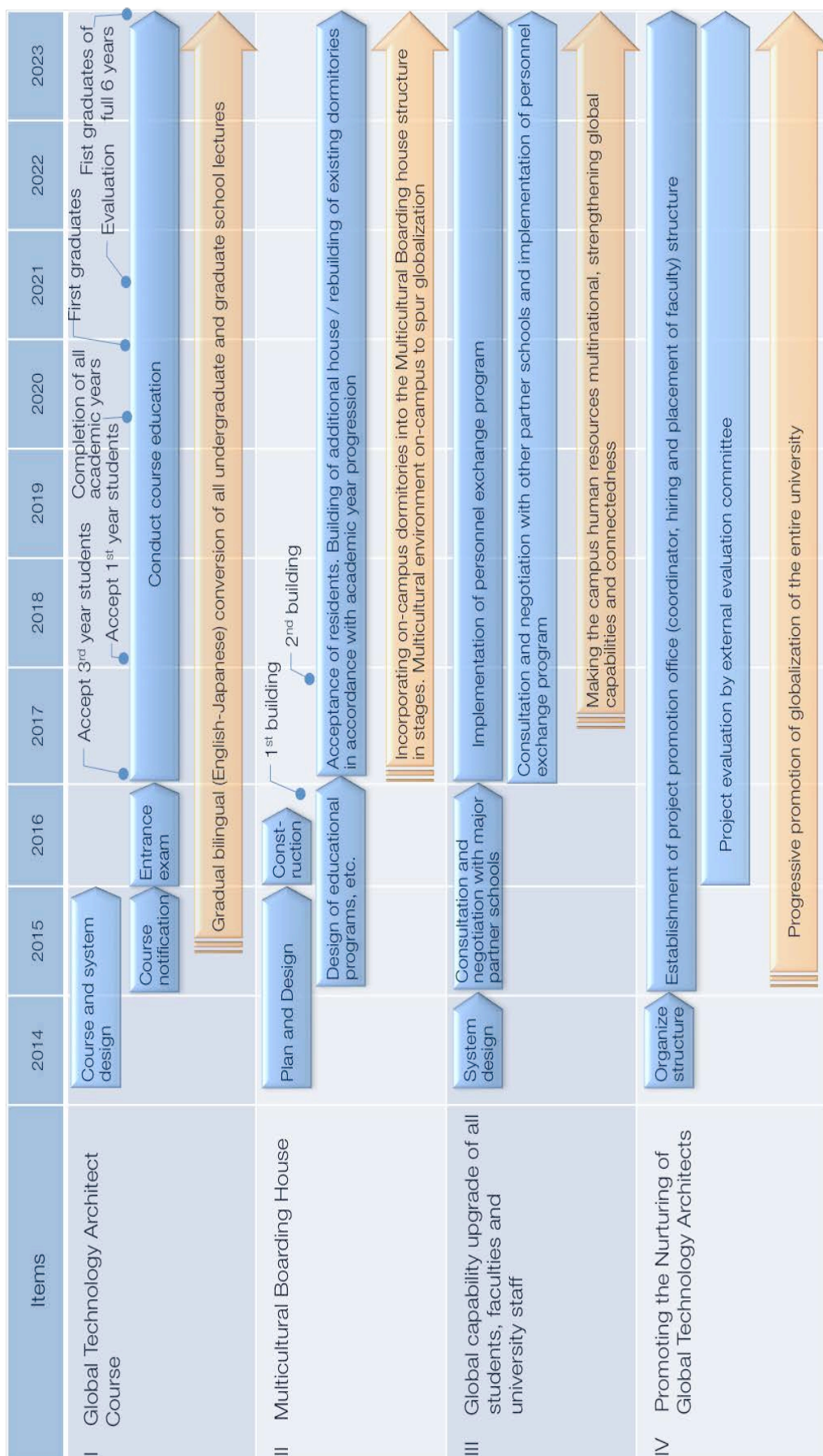
National University Reform Enhancement Promotion Project

Tri-Institutional collaborative / cooperative education reform project

Existing educational systems / programs / projects

2. Time Schedule

Time schedule: Creative Campus for Nurturing Global Technology Architects

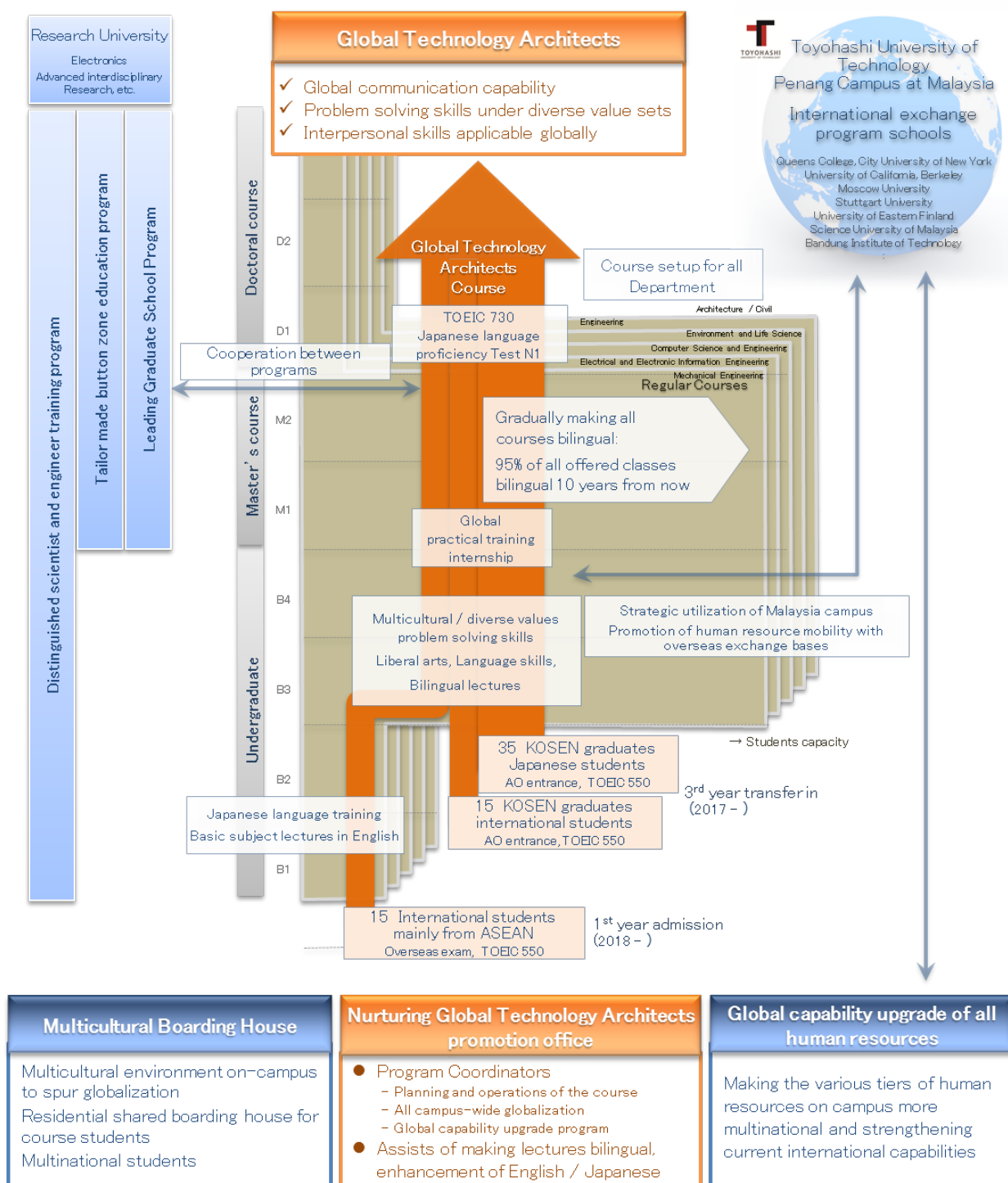


3. Creativity and Extensibility of the Concept

Creative Campus for Nurturing Global Technology Architects

Creativity: Fostering practical and highly creative global engineers

Extensibility: Intensive drive towards creation of a fully globalized campus by multicultural environment and university-wide academically bilingual



4. Project Common Performance Indices and Performance Goals

Use the Global Technology Architects course to globalize the entire university

- ✓ Training students to become bilingual (English-Japanese)
- ✓ Making all lectures throughout the university bilingual
- ✓ Strengthening language education
- Lectures in Bilingual or English

2013	→	2023
19.0%		94.8%
- Syllabus in English

16.1%	→	100 %
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- Students satisfy the foreign language skill standard

4.0%	→	51.0%
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Multicultural Boarding House spurring university-wide globalization

- ✓ Communal style global dormitory
- ✓ Formation of multicultural zone
- ✓ Spreading throughout the entire campus
- International students (full year)

2013	→	2023
10.3%		23.4%
- Japanese graduate students with overseas study experience

0.3%	→	8.9%
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- International students in cohabiting dormitory

39	→	200
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Creative Campus for Nurturing Global Technology Architects

■ Global communication ■ Problem solving under diverse value sets ■ Interpersonal skills

Performance goals of the program common indices

University-wide globalization via personnel exchanges for students, faculty and staff as well as transformation of the personnel system

- ✓ Utilization of the Penang campus, an extraordinary asset for a Japanese national university
- ✓ Constant human resource exchanges of faculty / staff / students with the partner schools overseas
- ✓ Introduction of an foreign language standard for faculty and staff

	2013	→	2023
● Foreign faculty	19.3%		22.7%
● Foreign staff	2.2%		6.5%
● Dispatching Japanese students based on exchange agreements	2.2%		8.8%
● Accepting international students based on exchange agreements	1.6%		9.2%
● Staff satisfying language standard	8.8%		27.1%

5. University's Original Performance Indices and Performance Goals

Original Indices and Performance Goals

1. Students in the dormitory from among the entire student body

2013
24.3%
(12.2%)

➡

2023
36.0%
(24.8%)

Students living in the dormitory / Total number of students body.
() Ration of students living in the dormitory who are from overseas

Residential communal boarding house for course students. Expand the on-campus multicultural coexistence zone by significantly increasing the percentage of students living in the dormitory.

2. Overseas internship

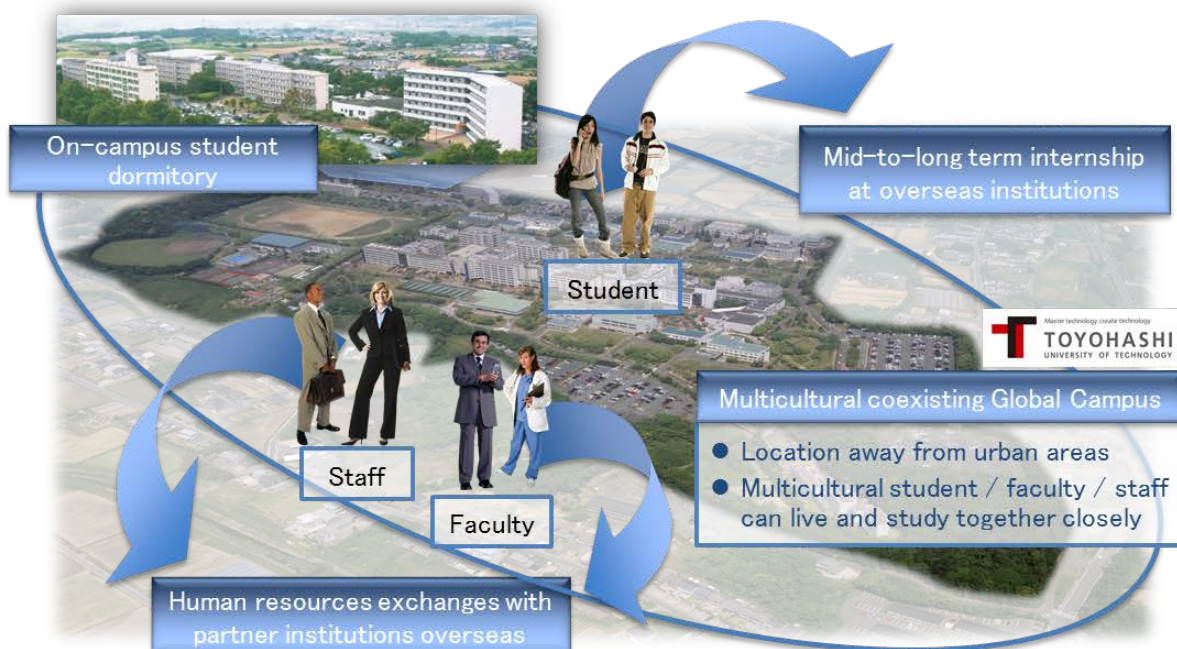
2013
9.8%

➡

2023
30.0%

Conduct mid-to-long term internships both within the country and overseas.

Promote internship at institutions in which the official language is not their native language; Japanese students dispatched to overseas organizations and international students to Japanese companies.



3. Overseas dispatch of staff

2013
2.9%

➡

2023
38.0%

Staff with overseas dispatch experience of more than 14days

Dispatch staff mainly to partner schools overseas.
Realize significant globalization in the university administrative organization by increasing the number of staff with overseas dispatch experience.

4. International joint research papers

2013
24.0%

➡

2023
30.0%

Dispatch faculty mainly to partner schools overseas and have them conduct research and education at there. Accept faculty from the partner schools and have them conduct research, education, lectures at this university.

Improve research capabilities and promote international joint research through this system.

Proposal Concept Overview

The Philosophy of the University

<The mission and philosophy of Toyohashi University of Technology>

The mission of Toyohashi University of Technology is the educating and researching of technological science (scholarship for the development of new technology with technology backed by science), and its philosophy is the nurturing of practical and creative leading engineers who have a well-rounded sense of humanity and a global view in addition to a willingness to coexist with nature, as well as the researching of ultramodern and pioneering technology that will inspire the next generation.

To this end, the university has been striving to provide an education (with special emphasis on our graduate schools) that will cultivate a keen sense of observation, a sensitive and warm sensibility, a pluralistic thinking ability, and a global perspective in our students. At the same time as promoting advanced research that will open up a new horizon for science and technology, we strive to improve collaboration with both local and global communities.

<The university's human resource development mission and the integrity of this proposal>

Based on the above mission and philosophy, the university is implementing the following distinct missions with the objective of developing human resources who will “master technology and create technology” in a global society. Both missions are incorporated in this proposal.

(1) Pioneering human resource development based on the undergraduate and graduate school combined education system. This system (which focuses mainly on students from technical colleges - KOSEN) aims to foster advanced engineers who have superior abilities in technological development and who have the capability to lead our nation's industries, as well as the areas of research and development to be globally competitive.

(2) Fostering engineers who can generate innovation and flourish globally by taking advantage of a distinctive track record of education such as the spiral-approach education (Fig.1) in which advanced fundamental subjects and specialty subjects are systematically reinforced.

(3) The active promotion of two-way student exchange with foreign universities, international joint research, and human resource exchanges centered on the ASEAN countries, utilizing our overseas education base at Malaysia (Fig.2), which is an extraordinary asset for a Japanese national university.



Fig. 1 Concept of spiral approach to Education

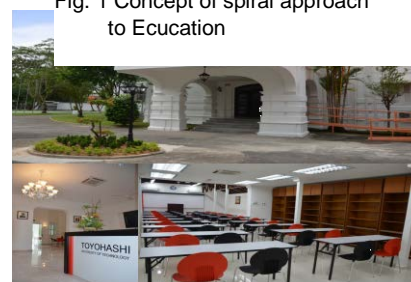


Fig. 2 Penang Campus (Malaysia)

The Objective of Proposal Concept

<The backdrop to this proposal>

Since the opening of this university in 1976 as a new concept national university, it has accepted transfer graduates from regular courses of KOSEN into the 3rd year of the undergraduate school and offered a 4-year combined education including a master's course. This helps us in fostering advanced and highly creative engineers, which allows Toyohashi University of Technology to make a valuable contribution towards supporting the industries of our nation.

However, against the current backdrop of the rapid globalization of society which is transforming traditional relations between countries (international relations), capital and information as well as products

and labor are starting to move ever increasingly on a global scale. This significant change has even transformed the qualifications demanded of the pioneering Japanese engineers who lead our nation's industries. There is now a pressing need for such engineers to have the interpersonal and cultural skills to enable them to work effectively worldwide.

<The objective of the proposal: Strategic and creative aspects and a global makeover of the entire university>

This proposal, based on the above backdrop and the university's mission and philosophy, aims to create a graduate school university that will foster "Global Technology Architects" with the following qualifications and capabilities by implementing various radical globalization measures university-wide, that we as a Japanese university have not been able to take up until now. Our mission of fostering high-level creative engineers is our distinctive feature, and our goal of using this platform to foster global technology architects is unique amongst universities worldwide. This program will be the vital step for us to transform ourselves into a national university capable of supporting Japan's global competitiveness and the sustained economic growth of our nation's industries in a profound way.

<Global Technology Architect: Vision / Leadership >

A "Global Technology Architect" is a practical and creative leading engineer who understands the diversity of the global community, and is capable of taking on challenges alongside people of different cultures and values. Global Technology Architects will have the technical and personal skills to address such problems, from envisioning an idea all the way through to providing and facilitating a practical solution. They will possess the following skills to a high degree:

- (1) **Global communication capability:** Ability to understand and express oneself amidst diverse value sets with superior language skills and open-mindedness toward different cultures
- (2) **Problem solving skills under diverse value sets:** The ability to grasp problems and analyze them as well as come up with ideas and create solutions backed by scientific knowledge and superior technical capabilities
- (3) **Interpersonal skills applicable globally:** Up to date cultural awareness, a willingness to take on challenges, plus a leadership ability tempered by a flexible and tolerant spirit of cooperation.

Overview of the Proposal Concept's Initiatives

To change Toyohashi University of Technology into a university that fosters the human resources required by today's global society (see above), the university will push through campus-wide globalization centered on the following initiatives.

- (1) Create a new combined undergraduate and graduate Global Technology Architect Course
- (2) Create a new global dormitory, the Multicultural Boarding House where students and faculty with diverse values will live together
- (3) Carry out a global capability upgrade of all students, faculty members and university staff
- (4) Newly establish a Global Technology Architect Promotion Office directly controlled by the president of the university
- (5) Campus-wide globalization centered on this program

<(1) Global Technology Architect Course >

The following are the features of the Global Technology Architect Course.

- ☐ **Target:** Establish a combined undergraduate / Master's program "Global Technology Architect Course" in all Divisions of programs and majors, in which students study in both English and Japanese (bilingual lectures). The acceptance of 3rd year transfer students from April 2017. Since all the 1st year transfer students will be international students, intake of students will occur from April

2018 following the organization of overseas recruitment and entrance exams, in addition to the re-organization of the 1st and 2nd year undergraduate education system.

□ **Course size and format:**

Overview: There will be 15 students each for the 1st and 2nd years of undergraduate school, 65 students each for the 3rd and 4th years of undergraduate school, and finally 65 students for each year in the master's course, for a total of 290 students.

Detailed Breakdown: The 3rd year transfers, which constitute the bulk of student intake at TUT, will be managed as follows. From among the entire student body, 50 students will be allotted to this course, and from among those, 35 students will be Japanese KOSEN regular course graduates and 15 will be international KOSEN regular course graduates. For 1st year admissions, from among the 80 places, 15 students will be allotted to this course, and all 15 students will be international students mainly from ASEAN nations. For the 3rd year intake, a few places will be available for non-KOSEN applicants, whether Japanese or international. For both 1st year and 3rd year intake, 'international' will be taken to include Japanese returnee students. The total number of students for the course will be 290 (13% of the entire university), and from among those, 140 students will be Japanese and 150 will be international students.

- **Selection:** Students who are very globally oriented and who are motivated to learn technology in both English and Japanese will be targeted, and these students will be recruited using the Admission Office (AO) entrance exam. In principle, English language ability will be demonstrated by a TOEIC score of 550 or its equivalent, and a strong interest in technology, qualities as a potential future global technology architect, interpersonal skills, and the student's willingness to actively communicate using both English and Japanese will be evaluated. International students transferring in their 3rd year will transfer into the university's regular course upon graduating from a technical school and will be assumed to have a Japanese language ability that will enable them to follow lectures. For 1st year international students, exams will be conducted in a location easy for them to access, such as the Penang Campus or another overseas liaison base.

- **Languages:** Courses will be designed to incorporate English and Japanese bilingual lectures (educational / presentation material, and notes on the blackboard will be in English, while the lectures, questions and answers, discussions, and exams will be done mainly in English but with Japanese too). 1st year international students will study the liberal arts and the basic specialized subjects in English. In conjunction with this, they will receive education in strengthening their Japanese ability, and from the second semester of the 1st year, they will receive education in bilingual lectures with students in regular courses, and by the time they move up to the 3rd grade, their Japanese is expected to be at a level in which they will be able to basically follow lectures in Japanese. After that, for the next four years until they complete the master's course, their lectures will be conducted in both English and Japanese. Students will be required to study Japanese corporate culture education, Japan-specific technical education and other such areas in Japanese, in addition to global business theories and suchlike in English. In consideration of the language abilities necessary for students' career paths, the completion standard for this course will be a score equivalent to TOEIC 730 or higher for all Japanese students, and the Japanese language proficiency test N1 or higher for all international students. For students taking the course, a mentor will be assigned, and there will be supervision and guidance in securing 250 hours of language learning time in the non-native language of the student (English or Japanese).

- **Course design:** The 1st year students will be taught their courses in common in the first semester, whereas from the second semester of the 1st year on the course will be divided into 5 different curriculums that will progress into advanced specialized education. New programs that will offer a broad internationally current liberal arts education and the fostering of problem solving skills amidst

diverse cultures will be developed. Two-month practical training internships in the 4th year of the undergraduate program will be a mandatory subject, and six-month practical training internships which take place over the last two months of the 4th year of the undergraduate program and the first four months of the graduate program will be an elective subject. They must be taken in a country where the student is a non-native speaker. By collaborating closely with the institutions where the students are dispatched, the results of the internship will be maximized by the setting and following of the progress of themes such as global problem solving.

- **The strategic utilization of the overseas education base in Malaysia and the international partner schools:** The university is now equipped to implement lectures that will accommodate up to 150 students at the university's overseas education base (the Penang Campus) on Penang Island, Malaysia, that was established under the National University Reform Enhancement Promotion Project, which commenced in 2012. By actively utilizing this institution to foster global technology architects and through local lectures and mid-to-long term overseas internships, English-based education will be implemented in Penang where people from ASEAN countries, China, and India, and other countries can work together in a multicultural environment. Moreover, with the establishment and enhancement of joint degree programs and double degree programs with partner schools, including the University of California, Berkeley, and Moscow University, and connecting this with strong overseas alumni networks, the university will aim to strategically gain superior international students from ASEAN and developed countries and boost its regular courses both qualitatively and quantitatively.

<(2) Boarding house where many cultures coexist and diverse values are shared >

- **The Multicultural Boarding House:** This dormitory will be newly built to reflect this university's philosophy to "master technology and create technology" and as a place where diverse values coexist, also envisioning the injection of private capital and methods to commission the provision of maintenance facilities and services. Two buildings of a communal style of house that will accommodate 100 people are planned, and by integrating these with the existing student apartments and the international accommodation facility, a special zone will be set up where 800 people (36% of the total student body) of diverse cultures can eat, live and learn together on-campus.
- **A boarding house for students taking the course:** The students of the Global Technology Architect Course will, in principle, apply to the boarding system and live in the Multicultural Boarding House, and the Japanese and international students enrolled in the undergraduate and graduate schools will use English as their common language and will foster their interpersonal skills by living together in this multicultural environment. In conjunction with having a permanently stationed housemaster in the Multicultural Boarding House, student assistants and faculty will also be resident. Efforts will be made to enhance the Multicultural Global Campus, using this new boarding house as a focus. For example English language support programs will be provided, and the Japanese and international students will be brought together through various events, and through implementation involving all the existing dormitories. In this way the Multicultural Boarding House will act as an educational dormitory that will nurture global qualities, interpersonal skills and cultural depth, in other words it will act as the hub of the campus wide globalizing project.

<(3) Making the campus multinational and strengthening international compatibility through global capability upgrade of all students, faculty members and university staff>

- **Global capability upgrade of all students, faculty members and university staff:** Ensuring that the students, faculty and university administration staff, on their various tiers of human resources on-campus establish a two-way connection with the global stage mostly through the portal of the university's overseas education base, the Penang School, as well as the many partner schools overseas. This interaction will be further boosted by the construction of a global educational /

academic affairs system which will enhance the ability to overcome language barriers between students and faculty.

- **The global faculty personnel exchange system:** For the faculty, alongside the global personnel exchange and unit exchanges with each research lab, the university's native English lectures conducted by foreign teachers will also be reinforced and the practical English educational and research skills of the university's outgoing teachers will be enhanced. With the acceleration of joint research, internationally current research (such as international joint research papers) will also be enhanced. In addition the administrative staff will systematically continue human resource exchanges such as with the international relations departments of partner schools overseas, and so enhance the internationally current capabilities of the entire campus.
- **The increase of the international student ratio:** Currently, the percentage of international students among the entire student body is approximately 10%, but with the establishment of the global technology architects course, it will increase to 20%. The students taking the course will be housed on-campus, such that the number of international residents in the dormitory will be increased to over 25%. Moreover, by accepting overseas internship students in the summer and winter by taking advantage of this slack period for residents in the dormitory, the percentage of international students on campus will be boosted year-round.

<(4) Implementation structure >

- **The establishment of the Project Promotion Office:** This project will be expanded under the strong leadership of the president by setting up the Global Technology Architect Promotion Office as part of the already existing international strategy division that is under the direct control of the president. The office will handle the overall work involved in making the entire university global, running the Global Technology Architect Course in addition to making all the lecture subjects bilingual (English-Japanese), including regular courses. Since the global engineering education promotion organization (Institute for Global Network Innovation in Technology Education – IGNITE) is already established, university-wide globalization will be promoted through close collaboration with this organization.
- **The annual plan of the Project Promotion Office:** In the first five-year period, the university will selectively conduct the starting up and implementation of the project such as its planning and formulating, the designing and setting up of the course and its entrance exam, in addition to the construction of the Multicultural Boarding House. By the time the first period is over, four years of the undergraduate level of the Global Technology Architect Course will have been completed, and in the second year of the second period, the first students to complete the course (masters) will leave the university to go out into the global community. In the second period, in conjunction with ongoing development based on the achievements of the first period, the university will strongly promote the globalization of the entire campus. It will prepare a system in which existing organizations such as the educational affairs section and the global engineering education promotion organization can take charge, in sequence, of running the Global Technology Architect Course.
- **The organization and the role of the Project Promotion Office:** For project promotion, one full-time Global Technology Architect Course coordinator, one global human resource circulation coordinator, and one university-wide globalization coordinator will be hired and placed in the Project Promotion Office. Moreover, a permanent support desk will be set up in the Promotion Office to lessen the burden on faculty who will be making the course education materials and lectures bilingual (English and Japanese), as well as the duplicate conducting of lectures with the regular course. The university will hire / place a full-time English lecturer(s) and five faculty members to assist in the running of the courses. In addition, this team will perform other tasks, such as strengthening the English ability of all faculty members by aiding in the creation of English education materials /

lectures throughout the university, assisting in the conversion of administrative functions to English and also assisting in the correcting and writing of English papers. In addition, as a part of the above-mentioned National University Reform Enhancement Promotion Project, the university has dispatched young teachers from KOSEN to Queens College, City University of New York (Fig. 3) for six months and had them learn English teaching methods as well as gain the experience of working overseas. A reinforced application of these initiatives will be applied to the university, and about five young people a year will be dispatched long-term to the USA. Through their learning of English teaching methods and conducting of joint research, the university will be assisted in promoting globalization that will cover the entire university.



Fig. 3 Queens College, City University of New York

<(5) The globalization of the entire campus with this program at the core >

- **The relationship between the Global Technology Architect Course and the regular courses:** By developing the original concept to proceed with standardization whereby the bilingual lectures of the Global Technology Architect Course are gradually applied to regular courses, and proceeding to make the subjects bilingual at regular courses at the same time, the university shall progressively work towards a target of 95% of all its subjects offered in English and Japanese. While keeping a balance between specialties and language abilities in the regular course lectures, the university will proceed in augmenting the provision of learning assistance (the reinforcement of the existing learning support room, the enabling of reviewing material with bilingual education material, the development of e-Learning training aids, the active use of TAs / tutors, etc.) for students taking lectures in a non-native language. With this, the university will promote a global engineering education not limited by language, university-wide, beyond the limits of the Global Technology Architect Course.
- **The spread throughout the university and international value:** The objective of this concept is the drastic reform of a national university to possess true internationally current capabilities, and through the following measures, the university will strongly promote the globalization of all students and faculty.
 - (1) The conversion of all undergraduate and graduate school lectures to being bilingual
 - (2) The creation of a campus for multinational coexistence based on a high ratio of international students (more than 20%).
 - (3) The sharing of diverse values through the utilization of the vital asset of an overseas education base (an extraordinary asset for a national university), and a residential program for the course
 - (4) The strategic securing of new students with advanced qualities

Accordingly, by significantly increasing the university's value and its presence in the global community, we intend to create a global technology university that will develop transnational technology-based human resources / knowledge, as well as the mobility of technology on a global level.