# TOKYO DENKI
# UNIVERSITY

Leading-Edge Education

Research and Development

for Science and Technology

**TDU**

# Development of Human Resources Who Contribute to Society by Technology

## Respect for Practical Study

Tokyo Denki University (TDU) was founded in 1907 by two young engineers who played active roles in the industrial world, Seiichi Hirota and Shinkichi Ogimoto, to concretize their sublime idea, "Promoting engineering education is indeed the foundation for the development of a nation." Through its solid and diligent academic culture, TDU has been fostering students for more than a century with the mission, "Development of Human Resources Who Contribute to Society by Technology." TDU also has been providing quality instruction based on the two educational maxims: "Respect for Practical Study" and "Students First." TDU continues to cultivate excellent human resources to meet the needs of society, changing with the times to make significant contributions to the development of Japan's science and technology.

Fundamental Educational and Research Ideal

## In the Technology Breathes its Creator

This is the motto of Yasujiro Niwa, widely known as the inventor of phototelegraphic transmission facsimile (Fax machine) and one of the ten greatest inventors in Japan, as selected by Japan Patent Office. He was also the first president of TDU and its graduate schools. His phrase has been adopted as TDU's fundamental educational and research ideal and guiding light. Niwa's words mean that a comprehensive technology embodies the engineer's character and ideas, and thus it is critical to cultivate engineers who can pursue the essence of technology and create new values with a broad vision.

Yasujiro Niwa (1893–1975)

## Understand that Internet of Things (IoT) is now base of Society; make it as food for the mind to nourish the next 100 years

Since its founding more than a century ago, TDU has made significant contributions to society, especially in science and technology. Our mission is to continue this good tradition of cultivating highly advanced and specialized engineers and researchers who exemplify our founding spirit, "Respect for Practical Study," in action. In retrospect, the twentieth century was an era in which *Monozukuri*, that is, "craftsmanship in manufacturing", enriched all our lives. Now, nearly two decades since the turn of the century, we must apply that same standard of excellence to producing not only materials but also minds – minds that are prepared to "Make knowledge become a reality" in a new way of contributing to society. This century's most important factory floor will be in IoT, where goods, knowledge, and ideas are inseparable. Therefore, we need engineers and researchers who can ensure that people who live in the IoT remain safe and secure, and who can enrich people's lives by building wisdom and sensibility into everything produced, fostering *Monozukuri* within both "head and heart."

The educators who guide our graduates recognize this trend, and know they are responsible for nurturing the young people who study at TDU. They also should emphasize how important respect of people who have different cultural backgrounds is, since the world will become more borderless and, therefore, multicultural interaction will become much more frequent and inevitable in this movement. They understand that what should be learned, what goals and dreams should be realized, and what we should contribute to society must harmonize with cyberspace. In this century, TDU will go through rapid and profound changes. To make our next 100 years shine, it is important that "all those who come to TDU regard the change and harmony as food for the mind, and keep contributing to society." To that end, TDU continues to position itself for the future, and is ready to launch you toward the next 100 years.

Hiroshi Yasuda
President and Professor
Tokyo Denki University

Completed doctoral program at the University of Tokyo. Worked for Nippon Telegraph and Telephone (known as NTT) and the University of Tokyo as a professor. Emmy award winner for his contribution to international standardization of JPEG and MPEG digital coding formats. Multidisciplinary cybersecurity technology advocate. Received Medal with Purple Ribbon.

# Contents

# TDU Highlights

**1907**
Established in

**214,110**
Graduates [1]

**10,068**
Total students [1]
9,218 Undergraduate students
850 Graduate students

**5** Undergraduate schools [2]

**5** Graduate schools

**20** Departments and divisions [2]

**21** Sections

**980**
The Times High Education World University Rankings 2016-17

**153**
International students accepted [1]

**300,000+**
Books in all the libraries [1], [3]

**10.99**
Student-faculty ratio [1]

**225**
Laboratories [4]

[1]: As of 5/1/2016
[2]: As the School of Information Environment and its courses stopped recruiting new students in AY2017, these are excluded from the numbers above.
[3]: Including electronic journals, books and magazines
[4]: As of 4/1/2016

# — History

## A "School for Engineers" – Established by Young Engineers

TDU established in 1907 as *Denki School* in the Kanda district of Tokyo, began as an evening vocational school with the founding mission of preparing for industrial expansion by "fostering engineers who can play significant roles in society and industry." Although superior technologies and up-to-date machines had been imported with rapidity, influenced by westernization, there were only a few engineers who could take advantage of these technologies and machines. The co-founders, two young engineers, Seiichi Hirota and Shinkichi Ogimoto, understood that this was a huge obstacle that would inhibit Japan's development, and knew that engineering education was needed to form a solid foundation for national development. To meet this need, they established the School and opened their doors to those eager to study engineering. Although the School began with just fourteen students, its value, driven by the founders' passion and educational ideals, were recognized immediately: "There is no education that is as innovative, creative, and motivated as *Denki School*." For the next century, the school's enrollment grew rapidly and students embraced TDU's spirit and good traditions. In 2007, TDU marked its 100th anniversary, and continues to advance toward the next one hundred years.

Seiichi Hirota
(1871–1930)
Co-founder

Shinkichi Ogimoto
(1875–1942)
Co-founder

## 110+ Years of History since 1907

1907
- *Denki School* founded in Kanda, Tokyo, as an evening vocational school (predecessor of TDU). **1**
- "Respect for Practical Study" becomes main education policy.

1908
- The first 14 students graduated from *Denki School*.

1914
- Ohmsha (well known as a publisher of scientific and engineering books) founded by Seiichi Hirota, a co-founder of *Denki School*. **2**

1924
- Experimental radio broadcasts started at *Denki School*. This was ahead of Japan's national broadcasting agency, NHK, which began its experimental broadcasts the following year. NHK started its regular broadcasts to the public about one year after that. **3**

1926
- Rapid Students' Increase by Distinctive Education: *Denki School* enrollment topped 11,000 students. **4**

1928
- Yasujiro Niwa (later TDU's first president) succeeds in conducting photo telegraphic transmission. **5**
- Emperor Hirohito's enthronement ceremony held in Kyoto in 1928; images of the ceremony were transmitted from Kyoto to Tokyo in what was, in essence, Japan's first successful facsimile (FAX) transmission, made possible through the use of "NE-type" photo telegraphic transmission device invented by Dr. Niwa, TDU's first president. **6**

1928
- Japan's first public demonstration of television, as Kenjiro Takayanagi, the "Father of Television," conducts Japan's first experimental television transmission in front of a crowd in *Denki School*'s laboratory. TDU earned the honor of being selected as the venue by being the only institution in Japan to have technical facilities with the advanced capabilities required. **7**

1949
- *Denki School* became Tokyo Denki University with the establishment of the School of Engineering at Kanda Campus. **7**
- Yasujiro Niwa becomes the first president of TDU.
- "In the Technology Breathes its Creator" becomes the University's motto and guiding light.

1958
- TDU's Graduate School was founded (Japan's first evening graduate school).

1977
- School of Science and Engineering founded (Saitama Hatoyama Campus). **8**

1990
- Chiba New Town Campus founded. **9**

2000
- TDU awarded Technology Licensing Organization (TLO) accreditation; first TLO accreditation was granted as a science and technology university.

2001
- School of Information Environment founded at Chiba New Town Campus.

2007
- 100th anniversary of TDU
- School of Science and Technology for Future Life was founded. **10**

2012
- Tokyo Senju Campus opened near the east exit of Kita-senju Station. **11**

2017
- Tokyo Senju Campus No. 5 Building was built. **12**

# — Distinctive Graduates

There are over 210,000 TDU graduates. TDU has brought essence of science and technology to the world and has made multiple effects on actual social activities such as R&D, dissemination of frontier technology and corporation management. TDU graduates have been making great achievements in not only in Japan but also in the whole world.

## "Have a grand dream, and make it real!" Advanced Step in Innovative Mobility (ASIMO)

Satoshi Shigemi, Head of Robot Development at Honda R&D Co., Ltd.

TDU graduate Satoshi Shigemi has been directing the development of the Honda's humanoid robot, ASIMO, as the company's supervisor of robot development. Honda R&D Co., Ltd. started its humanoid robot research and development in 1986, and Shigemi has been engaged in the project since its inception. The project's goal is to develop a robot that interacts with people, serves their needs, and gains their favor. The project began with research of "human movement," when the team tackled the challenges developing a robot that could easily walk, run, and grab – actions people do unconsciously. Their persistent efforts finally have borne fruit; the original ASIMO was born in 2000. The 2011 evolution of ASIMO has the world's first autonomous behavior control technology. Shigemi says he developed his interest in technological fields in TDU's free atmosphere; since then he has broadened his view of the engineering world with ASIMO's development. "The greatest pleasure of this project is discovering so much about how great human beings are, though a lot remains to be accomplished." ASIMO will keep evolving until the dream of "helping people and enriching their lives" comes true.

Photo courtesy of Honda Motor Co., Ltd.
ASIMO (current version)

## "A technology is not an adventure. With strong confidence I can make it."

Toshio Kashio, Inventor, Co-founder of CASIO COMPUTER CO., LTD.
Honorary Doctorate of TDU

Kashio was touched by Edison's biography and aimed to be an inventor. He recalled that his studies at *Denki School* (now TDU) were of great benefit in his subsequent R&D projects. Always an original thinker interested in pursuing the nature of things, Kashio spent seven years commercializing a compact all-electric calculator, and then did the same for watches and electronic musical instruments based on what he'd learned from the calculator's technologies. He developed the first world's automatic calendar wristwatch, CASIOTRON, in 1974. The G-SHOCK, a shock-resistant wristwatch evolved from CASIOTRON in 1983. This evolution established a new concept of wristwatches – and made the brand CASIO a worldwide name. "I invent things we need but that nobody in the world has yet noticed we need." Kashio famously said, "Don't let your dream be just a dream; make it real. Reach for the sky."

Photo courtesy of CASIO COMPUTER CO., LTD.
G-SHOCK (a design evolved from the original model)

## Companies at which TDU graduates serve as CEOs, presidents, or board chairpersons

13 TDU graduates represent listed companies (ranked 36th in Japanese universities) and 73 alumni and alumnae work for listed companies as board members (ranked 54th in Japanese universities)
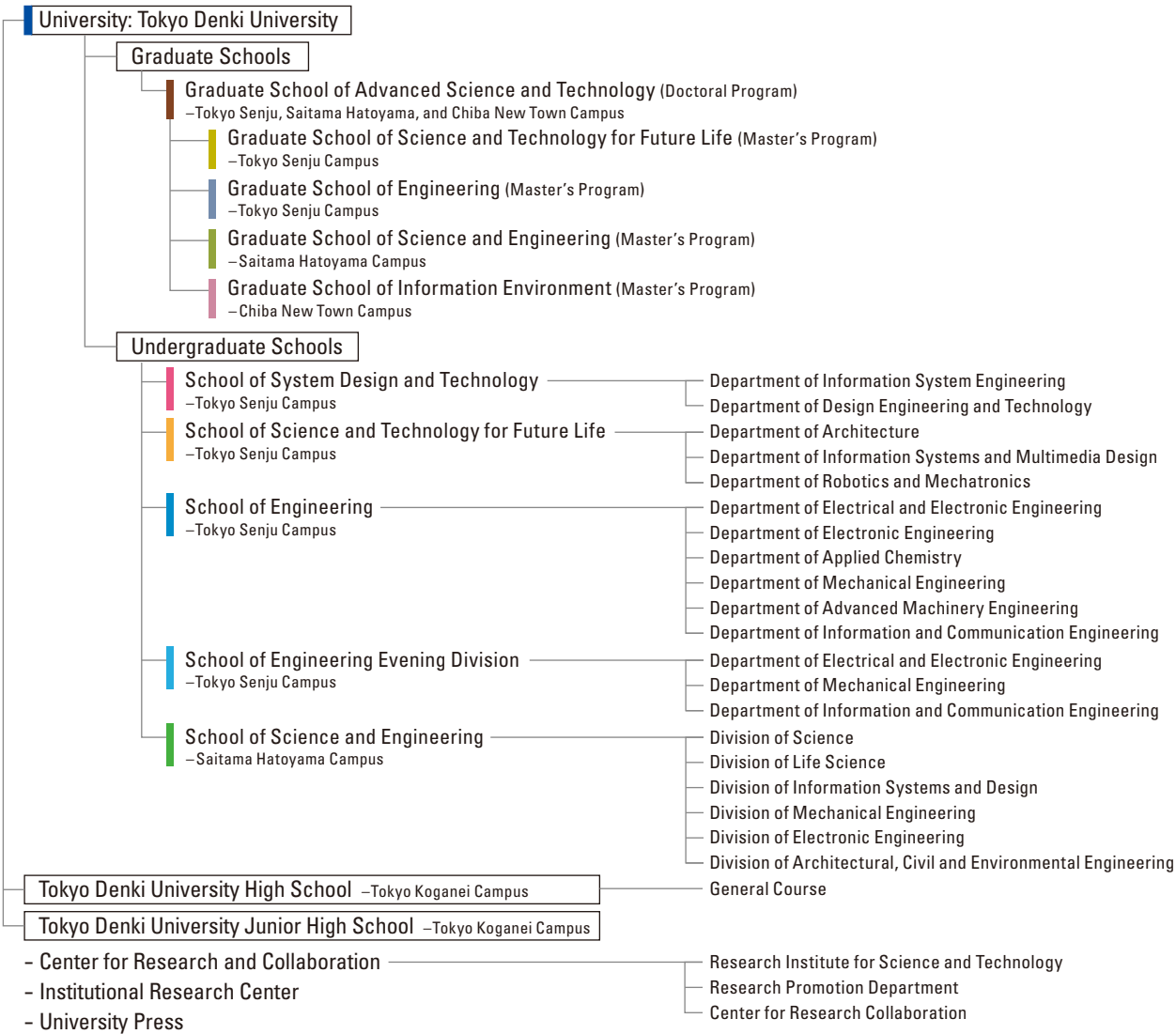
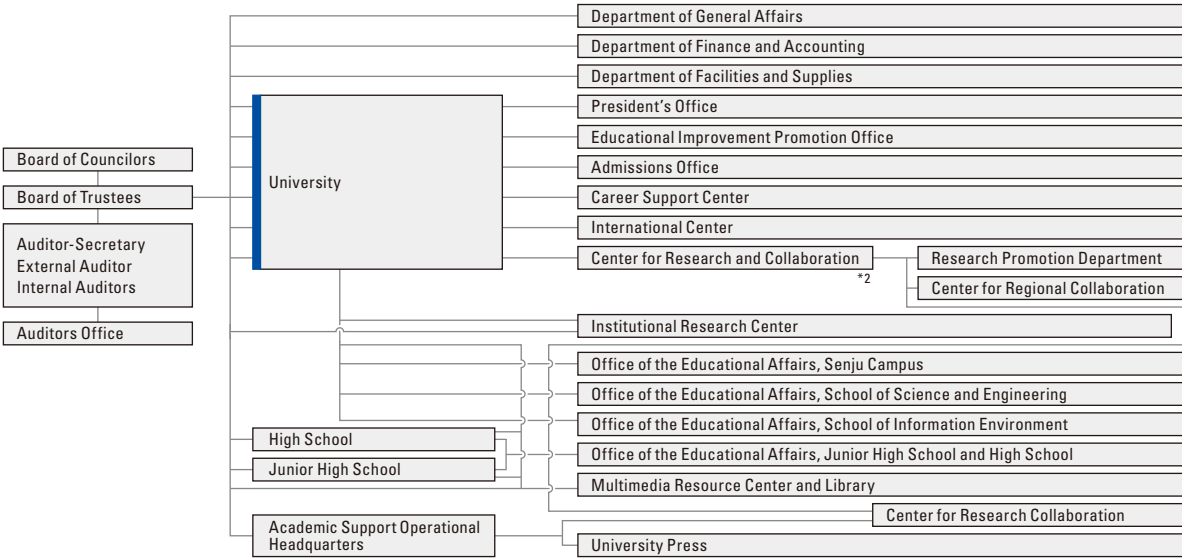| Company Name | Stated Capital (in M¥) | Number of Employees | Company Name | Stated Capital (in M¥) | Number of Employees |
|---|---|---|---|---|---|
| Alpine Electronics, Inc. | 25,900 | 11,343 | Macnica Fuji Electronics Holdings, Inc. | 10,000 | 2,360 |
| Central Japan Railway Company | 112,000 | 28,741 | Mystar Engineering Corp. | 981 | 1,796 |
| Doshisha Corporation | 4,900 | 1,827 | Sekonic Holdings Corporation | 1,600 | 602 |
| Fuji Latex Co., Ltd. | 643 | 263 | Sodick Co., Ltd. | 20,700 | 3,183 |
| Fuji Soft Incorporated | 26,200 | 10,494 | System Information Co., Ltd. | 300 | 336 |
| Funai Electric Co., Ltd. | 31,300 | 3,604 | Systems Design Co., Ltd. | 333 | 445 |
| Furubayashi Shiko Co., Ltd. | 2,100 | 642 | Taikisha Ltd. | 6,400 | 4,795 |
| K's Holdings Corporation | 12,900 | 1,589 | Techno Horizon Holdings Co., Ltd. | 2,500 | *1 1,090 |
| Kameda Seika Co., Ltd. | 1,900 | 3,043 | Teikoku Tsushin Kogyo Co., Ltd. | 3,400 | 2,554 |
| Kandenko Co., Ltd. | 10,200 | 8,839 | Topcon Corporation | 16,600 | 4,148 |
| Ki Holdings Co., Ltd. | 9,200 | 1,589 | Toyo Electric Corporation | 1,000 | 523 |
| Komaihaltec Inc. | 6,600 | 505 | Yamaka Electric Construction Co., Ltd. | 989 | 120 |

*1: Consolidated basis

# — Organization

## Juridical Person, Tokyo Denki University

Foundation: September 11,1907
Board of trustees, Chairperson: Yasutaro Kato
Auditor: Ernst & Young ShinNihon LLC
Faculty and staff size: 1,219 (Academic: 1,040, Nonacademic: 179)

University: Tokyo Denki University

### Graduate Schools

- Graduate School of Advanced Science and Technology (Doctoral Program)
  —Tokyo Senju, Saitama Hatoyama, and Chiba New Town Campus
- Graduate School of Science and Technology for Future Life (Master's Program)
  —Tokyo Senju Campus
- Graduate School of Engineering (Master's Program)
  —Tokyo Senju Campus
- Graduate School of Science and Engineering (Master's Program)
  —Saitama Hatoyama Campus
- Graduate School of Information Environment (Master's Program)
  —Chiba New Town Campus

### Undergraduate Schools

- School of System Design and Technology
  —Tokyo Senju Campus
  - Department of Information System Engineering
  - Department of Design Engineering and Technology
- School of Science and Technology for Future Life
  —Tokyo Senju Campus
  - Department of Architecture
  - Department of Information Systems and Multimedia Design
  - Department of Robotics and Mechatronics
- School of Engineering
  —Tokyo Senju Campus
  - Department of Electrical and Electronic Engineering
  - Department of Electronic Engineering
  - Department of Applied Chemistry
  - Department of Mechanical Engineering
  - Department of Advanced Machinery Engineering
  - Department of Information and Communication Engineering
- School of Engineering Evening Division
  —Tokyo Senju Campus
  - Department of Electrical and Electronic Engineering
  - Department of Mechanical Engineering
  - Department of Information and Communication Engineering
- School of Science and Engineering
  —Saitama Hatoyama Campus
  - Division of Science
  - Division of Life Science
  - Division of Information Systems and Design
  - Division of Mechanical Engineering
  - Division of Electronic Engineering
  - Division of Architectural, Civil and Environmental Engineering
  - General Course

Tokyo Denki University High School —Tokyo Koganei Campus

Tokyo Denki University Junior High School —Tokyo Koganei Campus

- Center for Research and Collaboration
  - Research Institute for Science and Technology
  - Research Promotion Department
  - Center for Research Collaboration
- Institutional Research Center
- University Press

* The School of Information Environment stopped recruiting new students in AY2017.

## Administrative Organizations (Administrative Bureaus *1)

Board of Councilors
Board of Trustees
Auditor-Secretary
External Auditor
Internal Auditors
Auditors Office

University
- Department of General Affairs
- Department of Finance and Accounting
- Department of Facilities and Supplies
- President's Office
- Educational Improvement Promotion Office
- Admissions Office
- Career Support Center
- International Center
- Center for Research and Collaboration *2
  - Research Promotion Department
  - Center for Regional Collaboration
- Institutional Research Center
- Office of the Educational Affairs, Senju Campus
- Office of the Educational Affairs, School of Science and Engineering
- Office of the Educational Affairs, School of Information Environment
- Office of the Educational Affairs, Junior High School and High School
- Multimedia Resource Center and Library
- Center for Research Collaboration
- University Press

High School
Junior High School
Academic Support Operational Headquarters

*1 Excluding temporary organizations   *2 Excluding Research Institute for Science and Technology (RIST)

# — Campus Locations



## Tokyo Senju Campus

[Graduate Schools]
- Graduate School of Advanced Science and Technology
- Graduate School of Science and Technology for Future Life
- Graduate School of Engineering

[Undergraduate Schools]
- School of System Design and Technology
  Department of Information System Engineering / Department of Design Engineering and Technology
- School of Science and Technology for Future Life
  Department of Architecture / Department of Information Systems and Multimedia Design
  Department of Robotics and Mechatronics
- School of Engineering
  Department of Electrical and Electronic Engineering / Department of Electronic Engineering
  Department of Applied Chemistry / Department of Mechanical Engineering
  Department of Advanced Machinery Engineering / Department of Information and Communication Engineering
- School of Engineering Evening Division
  Department of Electrical and Electronic Engineering / Department of Mechanical Engineering
  Department of Information and Communication Engineering



## Saitama Hatoyama Campus

[Graduate Schools]
- Graduate School of Advanced Science and Technology
- Graduate School of Science and Engineering

[Undergraduate Schools]
- School of Science and Engineering
  Division of Science / Division of Life Science / Division of Information Systems and Design
  Division of Mechanical Engineering / Division of Electronic Engineering
  Division of Architectural, Civil and Environmental Engineering



## Chiba New Town Campus

[Graduate Schools]
- Graduate School of Advanced Science and Technology
- Graduate School of Information Environment

* The School of Information Environment and Graduate School of Information Environment will relocate from Chiba New Town Campus to Tokyo Senju Campus in April 2018.

## Tokyo Koganei Campus

- Tokyo Denki University High School
- Tokyo Denki University Junior High School

## Tokyo Kanda Campus

- University Press

# School of System Design and Technology



## Aims for new value creation based on knowledge and skills of engineering and human science

The School develops knowledge and skills necessary for system design and technology, cultivating in its students abilities that enable them to integrate technologies from various and different fields.

Building on students' advanced knowledge and programming skills regarding information system technologies, the School focuses on developing new information system technologies that will become the core network for collecting, accumulating, analyzing, and utilizing big data stably. The School also deepens students' understanding of each field of design engineering, combining cross-disciplinary knowledge with engineering principles to create new academic fields of study that enable students to develop and evaluate new products and services against a broadly informed framework.

### Department of Information System Engineering
Bachelor of Engineering

**Cultivates expertise and practical skills regarding advanced programming, computers, networks, and data science**

Graduates of this department are trained engineers with highly advanced computer and network knowledge, programming skills, and the ability to develop advanced information and communication systems for collecting, analyzing, and mining of data – experts in working with big data and cloud services that are required by today's IoT society, where everything is connected online. In addition to teaching knowledge and skills, the Department also enhances engineers' ethical values and abilities to adapt to globalization.

[ Fields of Study ]
• Computer Networks
• Software Development (Programming)
• Data Science

### Department of Design Engineering and Technology
Bachelor of Engineering

**Fosters engineers who understand essential human nature and have sophisticated design aptitude**

In a multi-faceted contemporary world, excellence in design requires the ability to observe "products, services, and space" from users' viewpoints and to turn the ideas into reality.

The Department cultivates students who can not only design a technical process from the planning to the user's review but also design the whole process sensitively with engineering knowledge and skills based on an understanding of human emotions and behaviors.

This policy leads to fostering students who can work actively on a global stage.

[ Fields of Study ]
• Design Engineering
• Engineering and Human Sciences
• Design Evaluation



# School of Science and Technology for Future Life



## Develops engineers who can create rich "future life spaces" through the integration of different fields

The School of Science and Technology for Future Life is aimed at preparing engineers to envision and design life spaces for our future society. The School promotes unique education and research systems concerning "living space" (architecture), "intelligent space" (information systems and multimedia design), and "dynamic space" (robotics and mechatronics). Through learning curricula that integrate these three fields, we foster engineers who can understand technologies and ideas in different fields, engage in diverse ways of thinking, and maintain a broad, comprehensive view for creating future life spaces.

To ensure that students master the fundamentals as well as an advanced specialty, the School offers consistent learning curricula from undergraduate to graduate school.

### Department of Architecture
Bachelor of Engineering

http://www.a.dendai.ac.jp/en/department.html

**Trains designers and engineers who combine a well-rounded education with practical skills in architecture**

It is the role of architecture to create peaceful and enriching spaces, and to support a safe and comfortable lifestyle. To build this future for architecture, the Department equips designers, engineers, and researchers with the practical skills to work on the international stage.

[ Fields of Study ]
• Art of Information, Analysis, and Expression
• Architectonics and Design Skills
• Dwelling Environment/Interior
• Architecture/Procreation
• Design/Devices
• History/City
• Environment/Appointments

### Department of Robotics and Mechatronics
Bachelor of Engineering

**Provides expertise applicable in a wide range of fields by training in four core engineering areas: mechanical, electric and electronics, information, and control**

Advancing students' expertise in mechanical engineering, electric and electronic engineering, information engineering, and control engineering, the Department develops trained engineers with a good command of mathematical modeling skills and the design skills necessary to learn advanced mechatronics technologies.

[ Fields of Study ]
• Machines and Control
• Electricity/Electronics and Control
• Information and Control

### Department of Information Systems and Multimedia Design
Bachelor of Engineering

**Connects people, society, and computers to deepen understanding of information and media**

This department integrates media studies and computer science. By deepening students' understanding of information and media from the perspectives of design, expression, and technology, we train the human resources who will support the foundations of the advanced information society and who can create the next generation of technology.

[ Fields of Study ]
• Creativity – Computer Graphics/Video and Music Expressions
• Web-Related Technologies
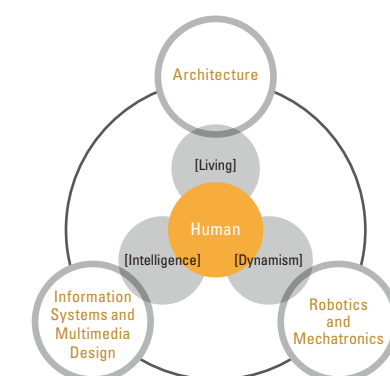


• Designing comfortable future living spaces through cooperative efforts among the three departments
• An educational system to provide professional capability and cultural enrichment
• Consistent learning curricula from undergraduate to graduate school
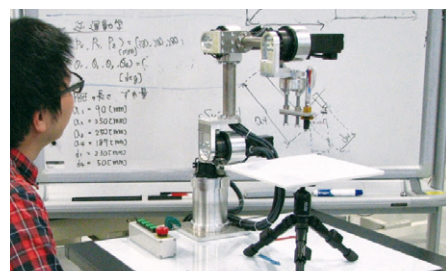
# School of Engineering

## Develops engineering experts who have international vision and competence

There is currently a need to develop unique and innovative technologies that contribute to the world. Those who assume this mission are the engineers and researchers who promote the development of cutting-edge technologies. The School of Engineering aims to develop high-level engineers required in the science and technology fields that will be the backbone of modern society – professionals who will continue to be in demand in the future.
The School of Engineering emphasizes education that encourages students to learn the engineering fundamentals and that elicits spontaneous ideas from students. The first year features workshops in which students can experience the joy of design and manufacturing.

*The School of Engineering (Evening Division) – This school is for students who work during day but who wish to use their evening hours to further their education.

## Department of Electrical and Electronic Engineering
Bachelor of Engineering

### Presents electrical and electronic engineering from a new viewpoint and teaches highly advanced technologies systematically

The Department provides students with the appropriate knowledge and skills with respect to power and electrical instruments, electrical information systems, and electrical devices so that they can play important roles as engineers in a wide range of industries. The Department emphasizes the cultivation of students who can keep themselves informed and who consider the well-being and welfare of humanity.

[ Fields of Study ]
• Electrical/Electronic Knowledge and Skills
• Electronic Information Systems
• Electric Devices

## Department of Applied Chemistry
Bachelor of Engineering

### Prepares students for four environmentally conscious fields, with a focus on researching new technologies for "sustainable buildout"

The field of eco-friendly materials is expanding as we seek to break the vicious and unsustainable cycle of large-scale production and consumption. Students of this department will add to the roster of materials that are eco- and user-friendly, indestructible, and cost effective for environmental preservation.
The Department cultivates students who can actively conduct research in the field of applied science to contribute to building a safe, comfortable, and sustainable society without reducing our standard of living.

[ Fields of Study ]
• Organic Chemistry
• Inorganic/Analytical Chemistry
• Physical Chemistry
• Chemical Engineering

## Department of Advanced Machinery Engineering
Bachelor of Engineering

### Teaches manufacturing from the fundamentals to advanced technologies in machinery engineering

Manufacturing products for our future society requires a solid base of basic knowledge and skills upon which to build. The Department conducts research and education regarding not only basic machinery engineering but also advanced machinery engineering, such as information, computer, optical sciences, and medical engineering. Students gain the basic and advanced technology knowledge of machinery, measurement, control, and precision machining that will enable them to work in a wide range of industries.

[ Fields of Study ]
• *Monozukuri* (Advanced Manufacturing)
• Medical/Welfare Instruments
• Advanced Machineries

## Department of Electronic Engineering
Bachelor of Engineering

### Understands the basic and the big picture of electronics, optics, and information technologies, and enhances employability

The Department trains engineers in a wide range of knowledge and skills, from the fundamentals to the advanced, with respect to the electronics, optics, and information technologies that serve as platforms for such common electronic products as smartphones, personal computers, LED lights, and Blu-ray recorders. The Department also improves students' research abilities and global employability as engineers/researchers.

[ Fields of Study ]
• High-functionality Home Electric Devices and Appliances
• High-functionality Materials/Optical Devices
• Electronic Information/Optical Transmission Systems
• Manufacturing/Control Technologies

## Department of Mechanical Engineering
Bachelor of Engineering

### Delivers basic knowledge and practical skills to mechanical engineers

The Department emphasizes the fundamentals to foster excellent generalists with applied skills with respect to understanding the main areas of mechanical engineering: materials, machines, fluid, and heat.
The Department also trains mechanical engineers to apply their skills and intellect toward playing significant roles in rapid innovation and growth in contemporary society.

[ Fields of Study ]
• Heat
• Design/Processing
• Fluid
• Oscillation/Control
• Materials

## Department of Information and Communication Engineering
Bachelor of Engineering

### Focuses on developing global networks through broad-based study and exchanges with the industrial world

The Department trains human resources in the social skills necessary to work independently as engineers, providing them with applied skills and insights along with a strong education in information and communication engineering, including information technologies centered on computers and communication technologies. To help develop their professional character, the Department provides students with opportunities to interact with industry and offers a wide variety of programs, from computer and communication systems to signal processing technologies and acoustic imagery. The students become versatile information and communication engineers who can understand hardware and write computer programs.

[ Fields of Study ]
• Communication Technology/Communication Network
• Multimedia
• Computer Systems
• Information Processing
• Mobile Devices

# School of Science and Engineering
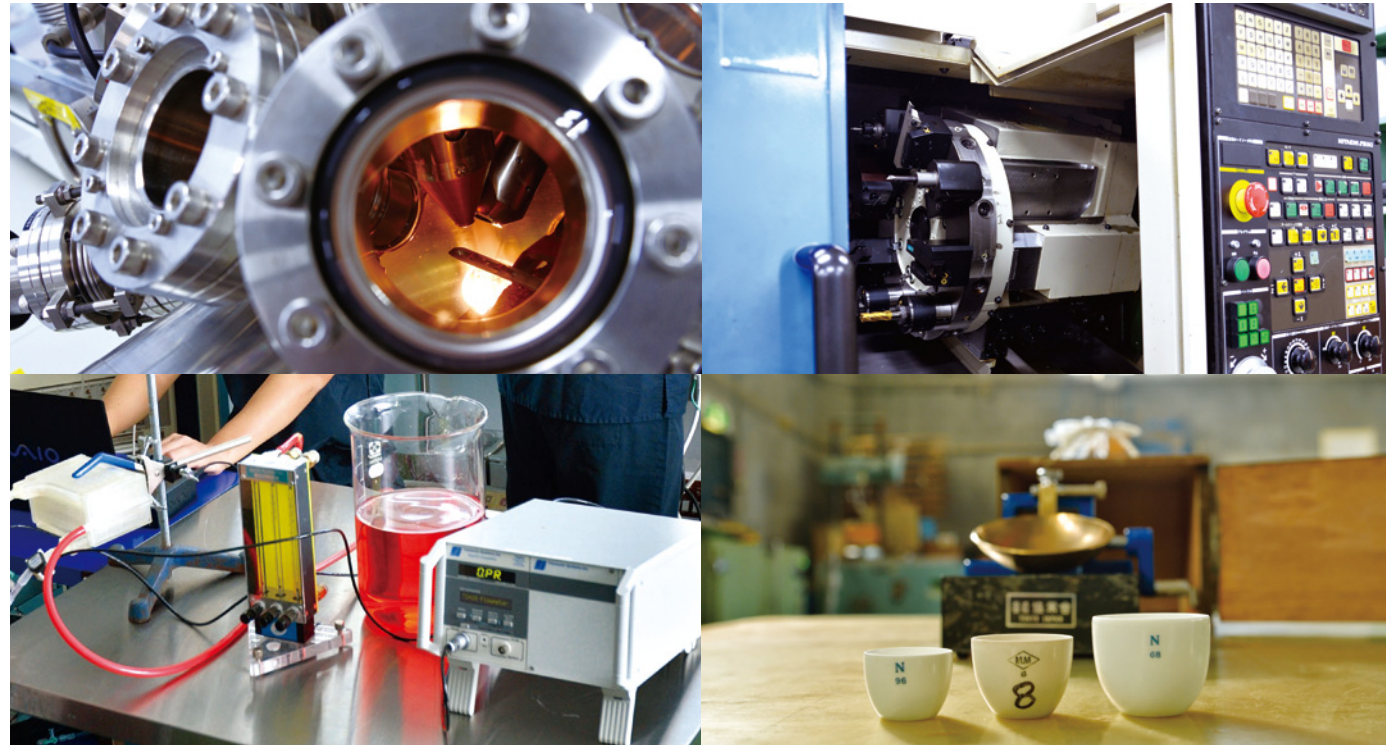
## Develops engineers with problem-solving abilities who can cope with rapid progress and the diversification of technology

The School of Science and Engineering conducts education and research activities in a practical manner within a framework encompassing five fields – science, engineering, information, life science, and environment – with the aim of developing researchers and engineers who can adjust to the rapid progress of science and technology in a dynamic society and who can be in humanity as members of society. Its basic policies provide venues where students interact with advanced research and development activities beyond the bounds of their academic majors and departments, which enhance their abilities to identify and solve problems. Students in their second year select a main course and a sub-course from among sixteen offerings in six academic categories, making it possible for them to strengthen their specialties and expand the scope of their interest to broader fields.

### Division of Science
**Bachelor of Science**

**Focuses on a new age of science and technology where students acquire extensive knowledge and applied skills, beginning with the foundations of mathematics and the natural sciences**

As well as forging an educational system capable of teaching a broad range of applied skills while still valuing the basics, the Division also equips human resources with the creativity and expertise to perceive the essence of problems and find resolutions.

[ Courses ]
• Mathematics
• Physics
• Chemistry
• Mathematical Informatics

### Division of Information Systems and Design
**Bachelor of Informatics**

**Produces engineers to be well-versed in information technology and social science, and explores the comprehensive informatics that are the foundation for computer technology**

The Division provides informatics specialists with expert knowledge and practical skills as they learn about informatics, which comprises several different areas, including; information, networks, computers, modern society, and creative expression.

[ Courses ]
• Computing and Software
• Information Systems
• Intelligent Information Design
• Amusement Design

### Division of Electronic Engineering
**Bachelor of Engineering**

**Fosters people-friendly engineers through learning about human needs and manufacturing**

With the social needs on talents with skill and knowledge of systematic engineering to enhance the social environment based of the advanced electronics and information technology, the Division provides a well-balanced portfolio of electric, electronic, and biomedical engineering. This program emphasizes the education, research, and development of applied electronics interface with humans and electronic equipment.

[ Courses ]
• Electronic Information Engineering
• Electronic Systems Engineering

### Division of Life Science
**Bachelor of Engineering**

**Aims to develop technologies that underpin healthy living such as regenerative medical techniques, novel agent and functional foods**

Our division seeks to achieve green – and life-innovations for human healthcare, through the development of the social and technological skills of our students. The department presently teaches two courses; the Environmental Science and Technology course and the Bioscience course. The main foci of the former course are applied microbiology, food science, and ecology for a sustainable society, while those of the latter course are the chemistry and developmental biology related to regenerative and pharmaceutical medicines. We integrate our educational and research activities to enable our students to adapt to social and technological changes, through collaborations with both the commercial and public sectors.

[ Courses ]
• Molecular Bioscience
• Environmental Biotechnology

### Division of Mechanical Engineering
**Bachelor of Engineering**

**Educates engineers who can adapt highly specialized technologies and cutting-edge engineering**

Aiming to train skills required for mechanical engineers, the course provides a basic curriculum of material mechanics, mechanical dynamics, fluid dynamics and thermodynamics. The emphasis of the education is placed to understand the fundamentals and advance expertise on analysis, design, manufacture and control of mechanical devices.

[ Courses ]
• Design and Analysis
• Manufacture and Control

### Division of Architectural, Civil, and Environmental Engineering
**Bachelor of Engineering**

**Develops engineers who can contribute to building a sustainable society of the future**

This program trains engineers in architecture, civil engineering, and environmental and city planning, with an emphasis on developing engineers who can contribute to building a sustainable society. Students learn about construction technologies, acquire expertise in environmental protection and environmental forecasting, and learn about the information technologies that support an advanced information society.
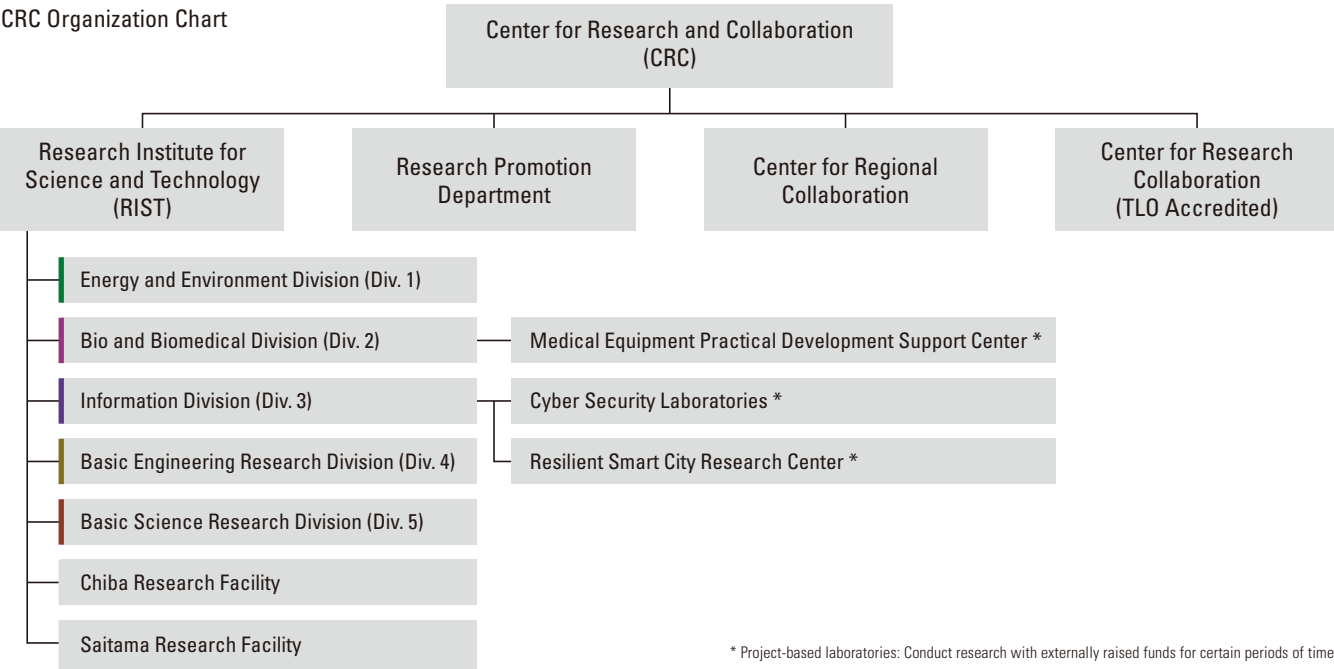
[ Courses ]
• Architecture
• Civil and Environmental Engineering

# TDU Power of Research 1

Based on the philosophy of "Respect for Practical Study," TDU provides the ideal environment and conditions for fostering outstanding engineers and researchers. By placing advanced technology and the results of research and development at the service of society, TDU has contributed to society's evolution. Here, TDU introduces the research facilities that have characterized those contributions.

CRC Organization Chart

Center for Research and Collaboration (CRC)

- Research Institute for Science and Technology (RIST)
- Research Promotion Department
- Center for Regional Collaboration
- Center for Research Collaboration (TLO Accredited)

Research Institute for Science and Technology (RIST):
- Energy and Environment Division (Div. 1)
- Bio and Biomedical Division (Div. 2) — Medical Equipment Practical Development Support Center *
- Information Division (Div. 3) — Cyber Security Laboratories *
- Basic Engineering Research Division (Div. 4) — Resilient Smart City Research Center *
- Basic Science Research Division (Div. 5)
- Chiba Research Facility
- Saitama Research Facility

* Project-based laboratories: Conduct research with externally raised funds for certain periods of time.

## Center for Research and Collaboration (CRC)

CRC sets up university-wide research policies aiming to realize humans' future dreams and create new industries. The Center also stimulates leading-edge research and development in a wide range of fields. CRC has strong commitment to R&D, especially in the four key research areas – energy and environment, bio and biomedical engineering, information, and safety and security – that are highly demanded by society. CRC makes every effort to share the results of the research conducted by TDU with our society through various activities such as patent and technical consultations, sponsored and joint research, workshops, and research facility tours.

## Research Institute for Science and Technology (RIST)
### University-wide comprehensive research institute

RIST was established in 1981 as a university-wide comprehensive research institute and has been positively supporting and unfurling research activities for TDU students and faculties. The Institute focuses on the university's original mission – knowledge creation – and contributes to society through by promoting project-based research, fostering junior scholars, and research funding review and allocation. RIST has expanded to comprise five divisions for responding to social challenges, developing the require technologies, and prioritizing fundamental study: Energy and Environment, Bio and Biomedical Engineering, Information, Basic Engineering Research, and Basic Science Research.

**Energy and Environment Division (Div. 1)**
Research for solving energy and environmental issues

**Bio and Biomedical Division (Div. 2)**
Research for medical and welfare; contributing to humankind broadly

**Information Division (Div. 3)**
Research for fundamental and applied information science technologies

**Basic Engineering Research Division (Div. 4)**
Research for basic engineering; focusing on future applications

**Basic Science Research Division (Div. 5)**
Research for fundamentals; aiming to build sustainable society

## Research Facilities

RIST owns Common Use Research Facilities at Saitama Hatoyama and Chiba New Town campuses. TDU students and faculties can conduct sophisticated, leading-edge research and studies at the facilities. RIST also boosts collaborative researches among regional enterprises and partner universities, and aims to uncover new knowledge.

### Chiba Research Facility

The Facility owns biomedical instrumentation, mechanical apparatus, and devices that enable users to conduct researches into human thought processes and behaviors and in medical and welfare domains – especially functional magnetic resonance imaging (fMRI) which is widely used by not only faculty members but also graduates and undergraduates.



**fMRI**
- Functional Magnetic Resonance Imaging (fMRI) – This is a neuroimaging apparatus that measures brain activity by detecting changes in blood flow within a magnetized field.



**Digital Versatile Electroencephalograph**
- This equipment measures brain waves using multichannel signals and conducts frequency and mapping analyses. The instrument has an advanced audiovisual stimulation control system and is used for various purposes such as event-related potentials, eye-fixation-related potentials, and sleep EEGs.

### Saitama Research Facility

The Facility has analytical, bio-related, and prototype testing laboratories. Any registered user can conduct studies at the facility. RIST aims to stimulate the studies of users by providing an environment in which researchers with different backgrounds can exchange knowledge, skills, and experiences by sharing the same laboratories.



**Analytical Laboratories**
- Chemical Analysis Laboratory: X-ray, diffractometer, photoelectron spectrometer, auger electron spectroscopy apparatus, etc.
- Optical Analysis Laboratory: scanning electron microscope, various spectral instruments, photometer, etc.



**Bio-Related Laboratories**
- Cellular Engineering Laboratory: cell culture facility, confocal microscope, flow cytometer, etc.
- Recombinant DNA Laboratory: individually ventilated cage system and biosafety level 2 (BSL-2) facilities
- Animal Surgery Operating Laboratory
- Microfabrication Laboratory: sputtering equipment, mask aligner, etc.
- Prototype Testing Laboratories
- Prototype Processing Facility: machining center, numerical controlled (NC) lathe, etc.
- High-Precision Processing Facility: 3D printer etc.
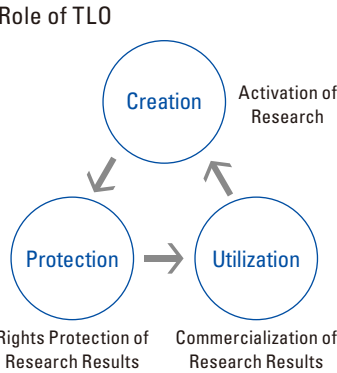


**Prototype Testing Laboratories**
- Prototype Processing Facility: machining center, numerical controlled (NC) lathe, etc.
- High-Precision Processing Facility: 3D printer etc.

## Center for Research Collaboration:
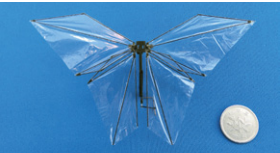## Technology Licensing Organization (TLO) Accredited
### The contact point for academic exchange

The Center for Research Collaboration promotes the development, management, and utilization of intellectual properties developed at TDU, while coordinating with public institutions such as the TLO within the University. In addition to promoting commissioned research and joint research projects, the Center holds lectures, seminars, and exhibitions related to fostering collaboration between industry and academia, as well as technology transfer.

The Center also conducts technical exchange and on-campus technical tours, and introduces research details of work conducted by students and teachers and the patents held by the University. In addition, the Center disseminates information outside TDU regarding the seeds of technology and research results based on the University's own research projects, as it actively seeks to return the fruits of its research activities to society.

**Role of TLO**

Creation — Activation of Research

Protection — Rights Protection of Research Results

Utilization — Commercialization of Research Results

## TLO Featured Researches

**Development of a Butterfly-Style Flapping Robot**

Assistant Professor Taro Fujikawa

Department of Robotics and Mechatronics
School of Science and Technology for Future Life

We have been developing a small flapping robot modeled after a butterfly that has a low flapping frequency and a few degrees of freedom of the wings as an observation system in narrow spaces. To realize practical flight of the robot, we analyzed the flight characteristics of a butterfly by performing experiments and using numerical simulations.
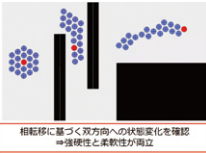
**Collective Movement Control Method for Swarm Robots Based on Thermodynamics Model**

Professor Tsuyoshi Suzuki

Department of Information and Communication Engineering
School of Engineering

This research proposes a collective movement control method for a swarm robot system based on the internal energy and the phase transition in a thermodynamic model. This system can move around obstacles in an environment by flexibly changing the aggregation shape in response to virtual attraction and repulsion forces calculated by the model.
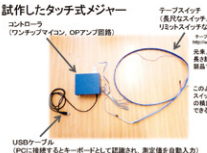
**Touch-Sensing Tape Measure with an Automatic Registering Function**

Professor Toshiya Yoshida

Department of Electrical and Electronic Engineering
School of Engineering

This provides a new tape measure. The tape is a kind of touch panel with long length and flexibility. The location data of the touched point on the surface is automatically registered in a PC. When two points are touched simultaneously the distance data between the two points is measured.
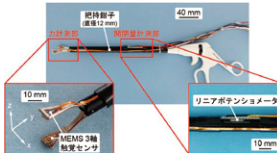
**Grasping Forceps with Sensors for Stiffness Estimation**

Assistant Professor Kenta Kuwana

Department of Precision Machinery Engineering
School of Engineering

In thoracoscopic surgery, it is difficult for surgeons to feel tactile sense because the surgery is conducted by using special endoscopic instruments. To assist the tactile sense of surgeons, we developed a grasping forceps with MEMS (Micro Electro Mechanical Systems) sensors. We can estimate the stiffness of the target objects by using these forceps.
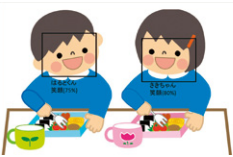
**A Study of Social Graph Analysis for Preschool Education Using Face Authentication**

Professor Makoto Hasegawa

Department of Information and Communication Engineering, School of Engineering

Social graph analysis for preschool education is being discussed. The social graph describes the relation between preschool children, moreover the relation between the children and teachers. It is created by face recognition and authentication systems that performs an identification for children and the preschool teacher from video capturing.
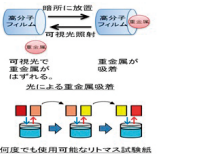
**Syntheses and Evaluation of Stimuli-Responsive Color-Changeable Functional Polymer Complexes**

Professor Takayuki Suzuki

Department of Applied Chemistry
School of Engineering

We have been studying functional polymer complexes, which show color change repeatedly responding to several stimuli: oxygen in air, hydronium ion (pH), and heavy-metal ions in water. The reversible color change is useful for detecting a certain target substance. Some polymer complexes display photo-reversible adsorption of oxygen or metal ions.
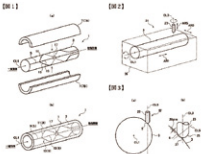
**Advanced Machining Processes in Autonomous Manufacturing Systems**

Professor Takashi Matsumura

Department of Mechanical Engineering
School of Engineering

Machining processes of advanced materials used for aerospace, automobile, information technology, energy and medical industries were studied to achieve high machining qualities at high machining rates.
The machining phenomena are modelled scientifically to control the processes with the simulations in the autonomous manufacturing systems. The developed simulation software is now running in the manufacturing divisions of aerospace and the automobile companies.
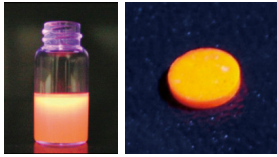
**Development of Novel Solar Cells Using Functional Silicon Nanostructures**

Professor Kenji Hirakuri and Associate Professor Keisuke Sato

Department of Electrical and Electronic Engineering
School of Engineering

We have taken on the challenge of developing silicon nanostructures having outstanding functions such as conductivity, fluorescence, and magnetism. Toward the development of environmental and energy fields, we are engaged in the fabrication of novel solar cells combining functional silicon nanostructures with organic polymers.

# Graduate Schools Overview

## Trains the highly advanced and specialized engineers desired by society

"Development of Graduates Who Contribute to Society by Technology" is TDU Graduate School's educational ideal.
Our esteemed graduate schools cultivate the highly skilled and specialized engineers desired by society.

### TDU Graduate Schools' Organizational Chart

**Graduate School of Advanced Science and Technology (Doctoral Program)**
- Mathematical Sciences
- Architecture, Civil, and Environmental Engineering
- Electrical and Electronic Systems Engineering
- Materials and Life Sciences
- Information, Communication, and Media Design Engineering
- Advanced Multidisciplinary Engineering
- Mechanical System Engineering
- Informatics

**Graduate School of Science and Technology for Future Life (Master's Program)**
- Architecture and Building Engineering
- Information Systems and Multimedia Design
- Robotics and Mechatronics

**Graduate School of Engineering (Master's Program)**
- Electrical and Electronic Engineering/Electrical and Electronics System Course
- Electrical and Electronic Engineering/Electronic, Photonic, and Information Engineering Course
- Materials Science and Engineering
- Mechanical Engineering/Mechanical Engineering Course
- Mechanical Engineering/Precision Machinery Engineering Course
- Information and Communication Engineering

**Graduate School of Science and Engineering (Master's Program)**
- Science
- Life Science and Engineering
- Informatics
- Electronic and Mechanical Engineering
- Architectural, Civil, and Environmental Engineering

**Graduate School of Information Environment (Master's Program)**
- Information Environment Technology

## Enhancement of Research Activities through Collaborative Graduate School Strategy

TDU established the Collaborative Graduate School Strategy to diversify research fields, enrich research contents, and promote dynamic educational activities. Under this strategy, graduate schools give students research guidance and instruction in cooperation with external public research institutions. Partners in this strategy are leading research institutes offering the latest equipment and facilities. Leading scientists and researchers in each respective field are invited as guest professors.

### Research Institutes with Cooperation Agreements with TDU's Graduate Schools

- Institute of Physical and Chemical Research (RIKEN)
- The Japan Aerospace Exploration Agency (JAXA)
- Central Research Institute of Electric Power Industry (CRIEPI)
- National Institute of Information and Communications Technology (NICT)
- NHK Science & Technology Research Laboratories (STRL)
- The National Institute of Advanced Industrial Science and Technology (AIST)
- National Institute for Materials Science (NIMS)
- The National Institute of Occupational Safety and Health (JNIOSH)
- National Maritime Research Institute (NMRI)
- NTT Basic Research Laboratories (BRL)

# Graduate School of Science and Technology for Future Life



## Fosters engineers who can propose, design and realize comfortable, beautiful, safe and secure life space to enable intellectual activities in the future society

The School teaches students three basic majors – architecture, information systems and multimedia design, and robotics and mechatronics – and integrates them as a multidisciplinary major to foster engineers who can understand and incorporate these different areas of technologies.

### Architecture and Building Engineering
Master of Engineering

http://www.a.dendai.ac.jp/en/graduate.html

**Trains creative and individualistic experts who combine professional skills with a well-rounded education**
The Program trains designers, engineers, and researchers to apply their professional skills and inclusive education in a manner that emphasizes enjoyment of the natural world and continued coexistence with the finite ecosystem on the planet.

[ Sections ]
• Spatial Design    • Engineering Design

### Robotics and Mechatronics
Master of Engineering

**Trains graduates who can synergistically consolidate basic technologies to address new challenges**
This program combines studies on basic technologies that are conventionally studied separately; namely, computer and information engineering, electrical and electronic engineering, mechanical engineering, and control engineering to encourage students to find synergies and build new academic disciplines with more advanced capacities.

[ Sections ]
• Information Driven Systems
• Mechatronics
• Robotics Design

### Information Systems and Multimedia Design
Master of Engineering

**Presents media studies as engineering with the aim of expanding the research area for information and media, and developing interdisciplinary and sophisticated research**
The Program trains experts with foresight and imagination to undertake research with an overarching perspective of fields related to communication technology, network configurations, and computer use.

[ Sections ]
• Multimedia
• Information



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# Graduate School of Engineering



## Trains engineers and researchers who can develop cutting-edge technologies with creativity and originality

The Graduate School of Engineering has introduced sophisticated educational and research systems to expand research areas and promote interdisciplinary approaches. By taking advantage of the Collaborative Graduate School Strategy, which involves cooperation with external research institutions, students can obtain guidance and instruction at public research institutions that have the latest equipment and capabilities. To contribute to global development through the technologies held by TDU, the School also accepts many researchers and students from around the world.

### Electrical and Electronic Engineering
### Electrical and Electronics System Course
Master of Engineering

**Expands research and education, from basic to advanced level, with a global perspective**
This program cultivates students with the ability to play a significant role in the area where electrical engineering, electronic engineering, and information engineering combine organically. It fosters students with strong skills who can approach research with a broad view and creativity, and teaches them how to contribute to the society worldwide as global engineers with diplomacy and linguistic skills.

[ Sections ] • Power System/Electric Instruments   • Electrical Systems   • Electric Devices

### Materials Science and Engineering
Master of Engineering

**Trains engineers to drive technological development based on social needs by creating and applying new eco-friendly materials and technologies**
Many of the highly advanced technologies that support the development of modern society have been achieved by developing new materials. This program takes a broad interdisciplinary approach to education and research based on comprehensive academic systems, from basic physical and chemical theories about new materials to applied technologies.

[ Sections ] • Solid State Physics   • Molecular Physics   • Organic Materials
• Material Chemistry   • Applied Physical and Chemical Properties
• Applied Microbiology and Bioengineering

### Mechanical Engineering
### Precision Machinery Engineering Course
Master of Engineering

**Teaches engineers to apply knowledge and skills from a variety of technological fields in innovative ways**
In this program, engineers draw on their knowledge and skills in such varied technological fields as electronic engineering, electrical engineering, and information domains to inspire innovative approaches to the challenges in fields from the traditional (materials, processing, measurement, and control) to the cutting-edge (optical application technology, medical, welfare, and robotics), without imposing the conventional framework of mechanical engineering.
Every industry needs superior mechanical engineers, making graduates of this major highly employable; they will have learned how to merge basic knowledge in various academic fields with the latest scientific discoveries, using intellect, foresight, and creativity. Engineers will have the important task of developing necessary goods and services for a vital society currently experiencing both a low birth rate and an aging population.

[ Sections ] • Material Science/Processing Systems   • Metrology/Control Systems
• Optical Application Systems   • Medical/Welfare Systems

### Electrical and Electronic Engineering
### Electronic, Photonic, and Information Engineering Course
Master of Engineering

**Helps students reach their maximum potential in specialties that meet the needs of industry and society**
Graduates of this course acquire advanced knowledge and skills in the field of electrical, optical, and information engineering, and enhance their competences to flourish as engineers in these interdisciplinary fields. Through this course, students increase their creativities and heighten their capabilities to conduct researches with a broader vision. This course also develops their abilities in terms of globalism, language capability, and diplomacy to be world-class engineers with global viewpoints.

[ Sections ] • Electronic Property/Electric Devices
• Electrical Systems/Electronic Information
• Optical Electronics/Optical Engineering

### Mechanical Engineering
### Mechanical Engineering Course
Master of Engineering

**Fosters engineers who can form the basis of a thriving industry with an expansive vision for the future**
Every industry needs superior engineers in mechanical engineering. Therefore, graduates of this program are eminently employable, with a wide variety of positions available to them. The program cultivates engineers who can merge basic knowledge in various academic fields, keep current with rapid scientific progress, and actively tackle the technical issues global society is facing with intellect, foresight, and creativity.

[ Sections ] • Material Science/Processing Systems
• (Micro-) Machine Element/Lubricant Systems
• Heat/Fluid Systems   • Metrology/Control Systems

### Information and Communication Engineering
Master of Engineering

**Aims to train and send out graduates equipped with advance expertise and creative power**
The evolving information society is supported by graduates who have acquired a solid basic knowledge of ICT and can apply advanced technologies to addressing the needs of different sectors of society. This program equips graduates with applied skills and creativity, underpinned by proven basic knowledge and advanced expertise.

[ Sections ] • Information System   • Information Processing
• Communication Systems

# Graduate School of Science and Engineering
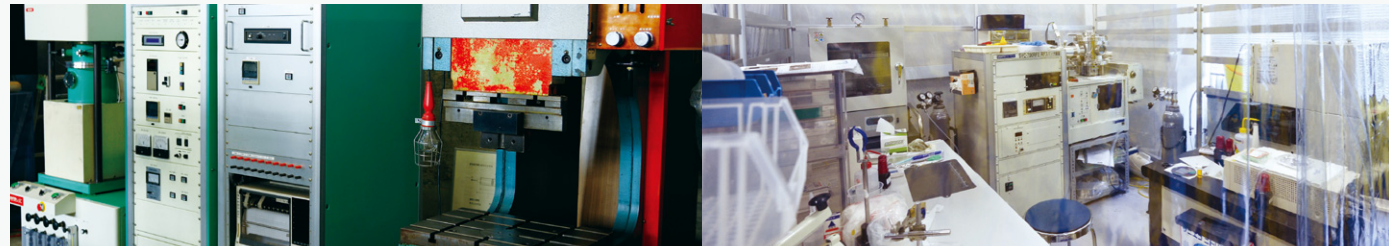


## Offers students various opportunities to expand their abilities to identify and solve the problems by providing cutting-edge research and development beyond their majors and departments

The Graduate School of Science and Engineering conducts and promotes joint research with public research institutions to strengthen relations with society and local communities. Through such activities, the School develops researchers and engineers who take a broad perspective with deep knowledge and insight.

### Science
Master of Science

Trains professional specialists who can provide the basic skills for a nation based on creative science and technology in the 21st century

Graduates of this program have a high degree of expertise in the natural sciences, and are professional specialists with system design and construction skills, a good command of mathematics, the ability to think logically, and the ability and experience to clarify material properties by analyzing experimental data.

[ Sections ]
• Mathematical Science  • Material Science

### Informatics
Master of Informatics

Trains sophisticated leading researchers and engineers with extensive knowledge, problem-solving skills, and the ability to make multifaceted and comprehensive judgments

Through interdisciplinary and multifaceted education and research in informatics, this program trains graduates to prepare the ground for developing the information industry, which is a key industry for the 21st century. We also aim to create a new academic discipline related to informatics.

[ Sections ]
• Information Systems  • Information Design

### Architectural, Civil and Environmental Engineering
Master of Engineering

Teaching a broad range of construction technologies such as architecture, urban, environmental and civil engineering, trains the engineers who will build the required urban, architectural and social infrastructure

This program trains graduates to work in a wide range of industries, including the architects who design urban spaces and residential buildings, the consultants whose collective expertise supports administrations and citizens in urban and environmental development, and the civil servants in charge of the administration of regional and urban planning.

[ Sections ]
• Architectural, Civil and Environmental Engineering

### Life Sciences and Engineering
Master of Engineering

Trains researchers and engineers to resolve the range of issues confronting humankind and the mysteries of life science phenomena

Supported by the two pillars of life as well as environmental science, and biomedical engineering, this program trains researchers and engineers to develop foodstuffs and biological resources, to safely produce important substances through the use of biological functions, and to work with technologies that support human life, such as gene therapies, artificial organs, medical devices, and assistive devices.

[ Sections ]
• Bioscience  • Biological Environment

### Electronic and Mechanical Engineering
Master of Engineering

Trains advanced engineers and researchers who can design and develop electronic and mechanical systems based on expert knowledge of electrical and electronic engineering, mechanical engineering, and biomedical engineering

Graduates of this program should be able to stretch the imagination with open-mindedness to observe the industry and prevision advanced solution to the social demands to ride over the rapidly evolving information society.
The Program will enhance the students' capability to precisely organize and publish the available results with system engineering skill. The graduates should be capable of proposing solutions to improve the wellbeing of the society based on the broad knowledge on electronic and mechanical system technologies and the practical experience on observing the interaction between human and environment, which are mastered through the course.

[ Sections ]
• Applied Electronic Engineering  • Mechanical System

# Graduate School of Information Environment



## Develops engineers who play an active role in the 21st century, keeping an eye on the progress of information-related science and trends that shape the future society

The basic education policy of the Graduate School of Information Environment is to foster capabilities and cultivate international engineers who demonstrate research skills, originality, creativity, and an entrepreneurial spirit. The School encourages graduates to acquire expertise pertaining to sophisticated information technology and to develop their academic research capabilities concerning the information environment.

### Information Environment Technology
Master of Information Environment

Trains graduates to flexibly adapt to and advance the rapidly progressing information environment

The 21st century has seen rapidly changing technological innovation in the information environment. This program trains graduates to become leaders in creative research, innovative development, and application of the latest technologies responding to the needs of industry. It also gives them broad, up-to-date technical expertise in survey and planning skills.

[ Sections ]
• Educational System Technology
• Information Network Engineering
• Intelligent Information Engineering
• Multimedia Engineering
• Medical and Welfare Engineering
• Spatial Design
• Communication Engineering
• Information Science

# Graduate School of Advanced Science and Technology
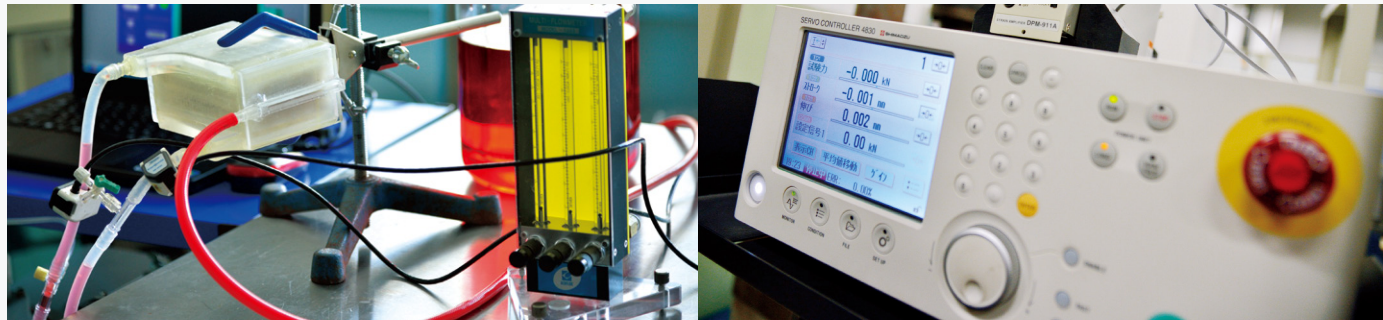


## Develops engineers who possess broad vision, international perspectives, and strong research and knowledge-creation capabilities

The Graduate School of Advanced Science and Technology encourages students to acquire sufficient abilities to independently conduct research activities with a broad vision in an internationally competitive research environment. The School develops engineers with highly creative research and development capabilities, as well as university-level teachers who possess skills in both teaching and research, who are qualified to support research institutions in every sector of industry, academia, and government.

The School comprises eight majors, but the wall separating these majors is permeable; professors and students can easily acquire information about relevant fields. There are also various research organizations affiliated with the university, and truly cutting-edge research programs are under way through international research collaborations.

Moreover, the Graduate School has proven itself capable of responding quickly to the mergers, collaborations, and combinations of research activities necessary for the advancement of research in both interdisciplinary and merging fields, and for the advancement of the international joint research that will be increasingly required in the future and for the development of new research fields. To promote communications with the world beyond the campus, the School also actively recommends participation in activities of academic societies and international conferences, and offers financial assistance for such participation. The School provides an environment for teachers and students to focus on their research activities.
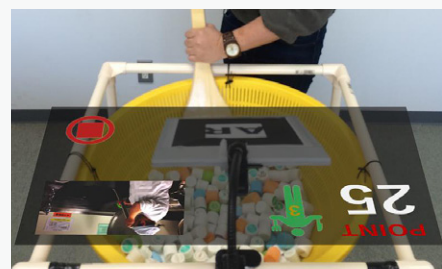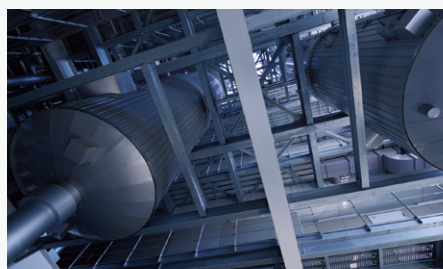


## Mathematical Sciences
### Doctor of Science

Trains creative graduates in the field of mathematics while researching and teaching across the disciplines of mathematics, chemical physics, and systems science

An interdisciplinary approach to mathematics and chemical physics, the pillars of basic science, adds a mathematical perspective to researching and teaching complex and large-scale engineering, system theories obtained by modeling human society, and concrete calculation methods.

[ Sections ]
- Mathematics
- Chemical Physics
- Systems Science
- Seminars and Conference Courses

## Information, Communication, and Media Design Engineering
### Doctor of Engineering

Educates creative researchers and engineers to contribute to the world by improving self-initiative and providing both a high level of expertise and a broad knowledge

This program promotes basic and advanced academic research in fields related to information communication and media engineering, and imbues graduates with an international outlook and a sense of self-initiative for research in a wide range of fields.

[ Sections ]
- Information and Communication Engineering
- Information Systems and Multimedia Design    • Information Environment

## Architecture, Civil, and Environmental Engineering
### Doctor of Engineering

Trains engineers to resolve complex social and urban issues through a new paradigm that integrates architecture, civil engineering, and the environment

This is not a conventional course that researches architecture, civil engineering, and the environment separately; this program aims to train engineers in new interdisciplinary paradigm and to imbue graduates with the problem-solving abilities required in a complex and diversified society.

[ Sections ]
- Architectural Safety and Computing
- Architectural Planning and Design; Town Planning
- Environmental Engineering and Building Equipment
- Disaster Prevention    • Environmental Engineering and Planning

## Advanced Multidisciplinary Engineering
### Doctor of Engineering or Doctor of Science

Develops existing technologies and creates next-generation technologies to provide scientific and technical support for human activities

This program trains graduates with the leadership qualities and international outlook necessary to create the next generation of technologies and to develop existing advanced science-and engineering-related technologies, as well as encouraging innovative support in the areas of human production, lifestyle, medical care, social welfare, disaster prevention, and other fields.

[ Sections ]
- Human Adaptive Mechatronics    • Medical Electronics
- Urban Disaster Mitigation Engineering

## Electrical and Electronic System Engineering
### Doctor of Engineering

Promotes research and education with a global and international outlook in areas where electric and electronic engineering integrate with information processing

This program conducts basic and advanced research and training in electrical and electronic engineering and information processing, as well as interdisciplinary areas, training researchers and top-level engineers to acquire creativity, foresight, and flexible thinking.

[ Sections ]
- Electronic Machinery    • Electronic Power Systems
- Measurements and Systems Control
- Physics of Electronic Materials and Electron Devices
- Electronics and Information Processing

## Mechanical System Engineering
### Doctor of Engineering

Promotes fundamental, practical, and critical research relating to the mechanical systems found in almost all industrial technologies

This program focuses on fundamental research in the field of mechanical engineering and related systems, aiming for results with practical applications. The Program also trains graduates to contribute solutions for the technological problems confronting modern society.

[ Sections ]
- Material Mechanics and Processing    • Design and Production Systems
- Energy and Environment Systems    • Heat and Fluid Systems
- Meteorology and Control System    • Opto-Mechatronics Systems
- Man-Machine Systems

## Materials and Life Sciences
### Doctor of Engineering or Doctor of Science

Combining material sciences, life sciences, and environmental studies, this program develops a new academic discipline that takes in the whole of humanity, industry, and society

To cultivate engineers and scientists who can deal with the problems faced by a developing society — including the environment, resources, energy, and social welfare — the Program integrates the traditional disciplines of materials science, life science, and environmental studies. Research and training of this program are aimed at building an academic discipline capable of taking on the whole of humanity, industry, and society.

[ Sections ]
- Life Engineering
- Life Science
- Organic Materials
- Materials Science and Engineering

## Informatics
### Doctor of Informatics

Researches information science and media science from a variety of perspectives, including the physical sciences, engineering, and information sociology, with the aim of developing an information society

Aiming for research and education in information science, the foundation for an advanced information society, and media informatics, which puts information to use in society, this program equips people with the advanced research and development skills required by an IT based society.

[ Sections ]
- Computer Science
- Media Informatics

### Laboratory for Information Security and Safety

## Towards the realization of a secure and user-friendly information environment

### Professor Hirofumi Yamaki
Department of Information System Engineering
School of System Design and Technology

We aim to realize a secure and user-friendly information environment based on computer networks and artificial intelligence. The advancement of computers and networks has enabled fast and rich communication among people. On the other hand, cyber-attacks and cyber-crimes have become major threats to human lives over the same period. Cyber security technologies are remedies for such situations, but, at the same time, they tend to limit the usefulness of information and communication technology. We believe artificial intelligence (AI) can be a solution to resolve such trade-offs. We develop a smart authentication mechanism which is mainly meant for public WiFi access services, where new standards such as IEEE 802.11u or FIDO are utilized for providing easy and secure Internet access and smart software agents help users in secure and easy access to such systems. We also work on AI-enabled cyber security. Recent cyber security solutions have begun to utilize AI for the detection of and the protection against cyber-attacks, while attackers are beginning to apply AI for their own purpose. In the near future, the confrontation between cyber-attacks and defenses will be that among AI-enabled systems. We are building a simulation system to analyze such situations.

http://www.sie.dendai.ac.jp/en/labs/prof/yamaki/index.html

### Energy and Environmental Systems Laboratory

## Pursues the study of green power impact assessments and the most effective way of supplying regional power

### Professor Masakazu Kato
Department of Electrical and Electronic Engineering
School of Engineering

The main research themes in the Energy and Environmental System Laboratory are planning, operating, controlling energy systems, and environmental assessments. Our program especially addresses the assessment of recyclable energy and how to take countermeasures against the negative effects when they are detected. We objectively conduct research regarding what will happen to our society when photovoltaics and wind electricity become more prevalent, and how we can promote such green power technologies if they have caused any concerns. Another important research topic is "smart communities," a theme we cover in a cross-disciplinary manner within TDU, conducting research to promote regional optimal design for not only electricity generation but also thermal energy and transportation infrastructure. The purpose is to establish efficient energy systems that are also cost-effective, such as the use of waste-driven electricity systems for power generation. We seek opportunities to provide electricity to local communities from waste disposal centers, during the aftermath of huge natural disasters that interrupt ordinary electricity supplies.

http://www.eee.dendai.ac.jp/eee/teacher/kato/kato_en.html

# TDU Power of Research 2

TDU has been developing highly intelligent professionals with advanced specializations to provide wide-ranging support to the knowledge-based society. Our research laboratories have supported the training of many outstanding technical experts. Here, TDU introduces the practical aspects of its research laboratories.

## Research Laboratories
The most distinctive feature of the Japanese engineering education

As the integrated institution for science and technology, TDU comprises a wide range of academic disciplines and cutting-edge research and development. These research activities are supported by 225 research laboratories for science, engineering, and social and human sciences. Our teaching staff, graduate students, and fourth-year undergraduate students working on their graduation projects make up the research laboratories, pursuing their own specialty areas under shared research topics. The research laboratories are places where students can deepen their own studies while encountering a variety of opinions and thoughts.

### Architecture and Design Laboratory

## Drives research that regards "architectural planning" and "environmental behavior" as two sides of the same coin

### Associate Professor Asuka Yamada
Department of Architecture
School of Science and Technology for Future Life

Our laboratory, which specializes in architectural planning and environmental behavior research, has been studying educational, medical, and welfare facilities. Our goal is to support people who are easily affected by their environment, and to accommodate their independent lives by improving their surroundings.
In Architectural Planning, our team studies prior phases of execution design, such as identifying a building's target users and uses, usability, security, and comfort, and then provide recommendations to the property owners, or our clients, based on our research.
In Environmental Behavior, on the other hand, we focus on the relationship between humans and the environment itself, and study human psychology and behavior under certain settings.
Conducting research that integrates both architectural planning and environmental behavior studies provides a broader perspective for the future needs of society and helps us predict what kinds of buildings we may need to construct beyond the current paradigm (for example, school facilities should be planned with considerations beyond a construction framework and should take into account the population and purpose of those schools). As a result, we can provide fruitful recommendations to prospective stakeholders. For instance, we designed a facility for elderly people and a playroom for children in a medical facility in conjunction with the concerned parties.

### Cellular Biochemical Laboratory

## Conducts research regarding cellular life cycles, making contribution to the medical sector, such as cancer management

### Professor Yukitoshi Nagahara
Division of Life Science and Engineering
School of Science and Engineering

We are focusing on the cellular function during cellular life – from birth, growth, differentiation, and finally, death. Programmed cell death, or so-called apoptosis, occurs to eliminate unnecessary cells (reaching the life expectancy or suffering injury and cannot function normally) for the body. The dying cell is eaten by the phagocytes and extinguishes itself. Once these cellular suicide mechanisms are collapsed, abnormal cells, unwanted by the body, multiply and various diseases like cancer occur. Therefore, cell death mechanism is well preserved among species and strictly regulated. Unraveling cell death pathways leads to artificially provoking cell death to particular cells, such as cancer cells, aiding the discovery of anti-cancer agents. We are currently researching the cellular function of several cancer cell specific apoptosis-inducing chemicals to elucidate how these chemicals induce cell death to specific cancer cells in the cellular level using both a molecular and chemical biology approaches.
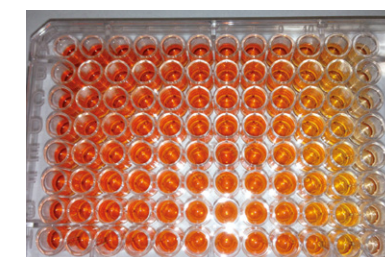
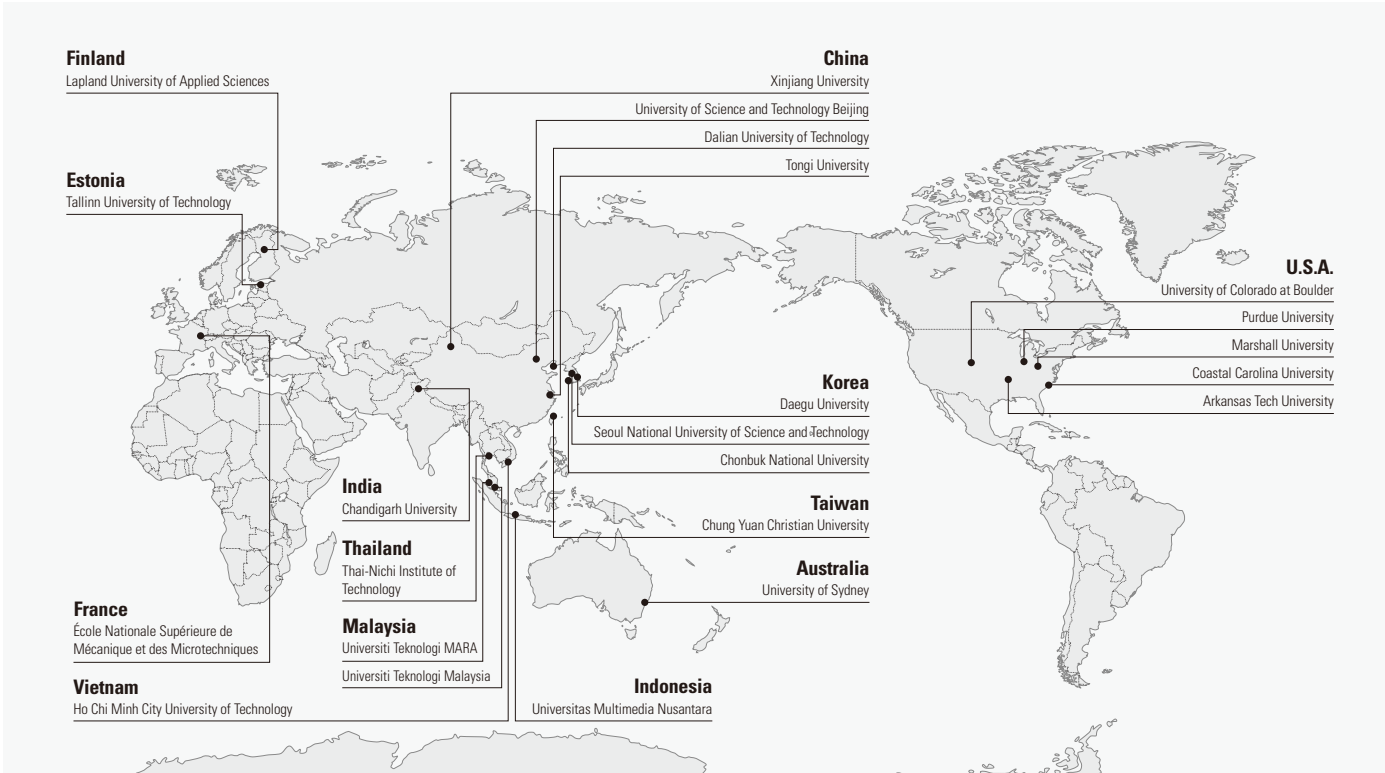http://www.b.dendai.ac.jp/~biochem/index_en.html

# Global Communication

## International Exchange

### Promotes active people-to-people exchange and collaborative researches with universities abroad

Given the rapid progress of globalization, it is essential for the young engineers who will bear the next generation to be internationally competitive to survive in a borderless world. TDU expects and supports them to have broader vision, to respect cultural differences and diversification, and to work in harmony under their own leadership. Global academic study activities are imperative today and engineers are required to be able to publish and present at academic conferences and to implement studies in collaboration with researchers around the world.

TDU actively undertakes international exchanges with 23 universities and research institutes in 13 countries and regions. TDU is currently home to approximately 200 foreign students from more than 12 countries (China, Mongolia, Korea, Singapore, Malaysia, Indonesia, Thailand, Myanmar, Vietnam, Saudi Arabia, France, Italy, etc.), including transfer students from École Nationale Supérieure de Mécanique et des Microtechniques (France) and the Malaysia Twinning Program (Malaysia).

### Overseas Universities with Academic and Cultural Exchanges

**Finland**
Lapland University of Applied Sciences

**Estonia**
Tallinn University of Technology

**France**
École Nationale Supérieure de Mécanique et des Microtechniques

**Vietnam**
Ho Chi Minh City University of Technology

**India**
Chandigarh University

**Thailand**
Thai-Nichi Institute of Technology

**Malaysia**
Universiti Teknologi MARA
Universiti Teknologi Malaysia

**Indonesia**
Universitas Multimedia Nusantara

**China**
Xinjiang University
University of Science and Technology Beijing
Dalian University of Technology
Tongi University

**Korea**
Daegu University
Seoul National University of Science and Technology
Chonbuk National University

**Taiwan**
Chung Yuan Christian University

**Australia**
University of Sydney

**U.S.A.**
University of Colorado at Boulder
Purdue University
Marshall University
Coastal Carolina University
Arkansas Tech University

## Support for International Students

TDU provides assistance services to help international students with their academic and personal lives. International Center and the on-campus Lounges offer various supports and host many events that encourage interaction between international and Japanese students. TDU also furnishes learning and career support to international students. In addition, scholarships and financial support for them are also available.

As a result of the considerate and generous assistance, TDU has been named by the Association for the Promotion of Japan Language Education as one of the best Japanese study-abroad destinations for international science and technology students.

### Guidance and Orientation

Guidance and Orientation are offered upon enrollment to support overall campus life such as course registration, health insurance, immigration, and housing to ensure a smooth first step to TDU life.

### Japanese Language Program

TDU offers after-class Japanese skill enhancement programs to keep up with specialized engineering and technology lectures and practices that are taught in Japanese. We provide Japanese language courses together with seminars on Japanese culture. Also, there are Japanese Clinics, through which international students can have individual support and tutorials.

### Student Events

The International Center organizes get-together meetings, cultural exchange events, school festivals, sports festivals, field trips, and activities that provide opportunities to foster intercultural friendships and to learn about Japanese culture.

### Japanese Chat Club

The International Center periodically offers cross-cultural communication gathering opportunities, named "Japanese Chat Club". International students have many chances to discuss various topics in Japanese with students, teachers, and local residents.

### Advisor

All the international students are assigned an advisor for consultation over academic life at TDU such as course studies, research laboratories, and career planing.

### Study Support

Study Support Center provides support to develop basic abilities for university education such as group study, mini lectures, supplementary lessons, and tutorial classes.

### International Student Community

The International Center sponsors International Student Community whereby Japanese student volunteers to help incoming international students learn their way around campus and life in Japan.

### Career Support

The Career Support Center provides international students various supports to find career opportunities in Japan. The Center offers personal counseling services, job and internship information, conducts job fairs and seminars.

### Scholarships and Financial Support for International Students

TDU has its own scholarship programs. Also there are scholarship programs offered by public and private organizations or educational foundations. TDU also offers graduate students wage-earning opportunities to work as a teaching or research assistant.

| Scholarship Name | Eligible Students | Description | Stipend |
|---|---|---|---|
| TDU Tuition Support Scholarships for International Students | Degree students (undergraduate and graduate) | These scholarships are for undergraduate and post graduate students with good academic standing and performance who face financial difficulties | One-third of annual tuition |
| TDU Benefactors' Scholarships for International Students | | | Depends on the scholarship |

# Data (As of 5/1/2016 unless otherwise stated)

## Gross area

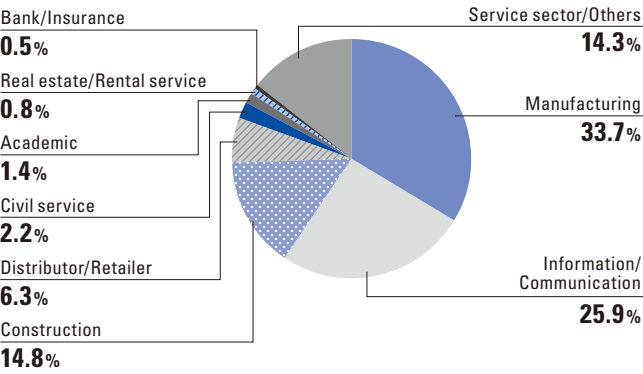| All campuses and grounds | 699,147.11 ㎡ |
| --- | --- |
| Tokyo Senju Campus | 26,221.39 ㎡ |
| Tokyo Kanda Campus | 481.70 ㎡ |
| Saitama Hatoyama Campus | 348,469.68 ㎡ |
| Chiba New Town Campus | 205,058.00 ㎡ |
| Tokyo Koganei Campus | 22,023.48 ㎡ |
| Tokyo Senju Campus Sports Ground | 7,918.86 ㎡ |
| Hiraoka Multi-purpose Ground | 88,974.00 ㎡ |

## Number of books, journals and magazines held

| Total | approx. 308,215 |
| --- | --- |
| For students | 217,935 books |
| For research | 17,288 books |
| Journals and magazines | 1,992 titles |
| Electronic Journals | 23,000 titles |
| Electronic books | 48,000 titles |

## Number of laptops and desktops owned — approx. 8,700

## Employment rate — 97.2%

| Number of students who wish to work after graduation | 1,557 |
| --- | --- |
| Number of students who have received job offers | 1,513 |

(Graduates as of March 2016)

## Placement ratio by industry

Bank/Insurance **0.5%**
Real estate/Rental service **0.8%**
Academic **1.4%**
Civil service **2.2%**
Distributor/Retailer **6.3%**
Construction **14.8%**
Service sector/Others **14.3%**
Manufacturing **33.7%**
Information/Communication **25.9%**

## Number of job offers to TDU students — 13,446

| Ratio of job offers to job seekers per student | approx. 8.2 |
| --- | --- |

(Nationwide average per student: 1.73, Source: Recruit Works Institute, as of 3/31/2016)

## Ratio of job offers received from top 3 choice companies — 92.8%

| Ratio of Job offer received from Top choice Company | 58.8% |
| --- | --- |

(Source: TDU, as of March 2016)

## Number of students — University — 10,068

| Graduate Schools | |
| --- | --- |
| Advanced Science and Technology (Doctoral program) | 49 |
| Science and Technology for Future Life (Master's Program) | 277 |
| Engineering (Master's program) | 299 |
| Science and Engineering (Master's program) | 170 |
| Information Environment (Master's program) | 55 |
| Undergraduate Schools | |
| Science and Technology for Future Life | 1,614 |
| Engineering | 2,947 |
| Engineering (Evening Division) | 701 |
| Science and Technology | 2,811 |
| Information Environment | 1,145 |
| High School | **741** |
| Junior High School | **500** |

## Number of faculty members — 916 (Graduate and undergraduate schools only)

| Full-time | 363 |
| --- | --- |
| Part-time | 553 |

## Number of alumni — 214,110

## Top 26 companies from which TDU graduates received job offers over the past five years (From March 2012 to 2016)

| Ranking | Company Name | Number of students | Listed Company on the Tokyo Stock Exchange: ○ |
| --- | --- | --- | --- |
| 1 | Mitsubishi Electric Corporation | 75 | ○ |
| 2 | East Japan Railway Company | 54 | ○ |
| 3 | NEC Corporation | 29 | ○ |
| 4 | Hitachi, Ltd. | 24 | ○ |
| 4 | Central Japan Railway Company | 24 | ○ |
| 6 | Suzuki Motor Corporation | 23 | ○ |
| 6 | Kandenko Co., Ltd. | 23 | ○ |
| 8 | Toppan Printing Co., Ltd. | 22 | ○ |
| 8 | Taisei Corporation | 22 | ○ |
| 10 | Fuji Electric Co., Ltd. | 21 | ○ |
| 10 | Honda Motor Co., Ltd. | 21 | ○ |
| 12 | Toyota Motor Corporation | 18 | ○ |
| 12 | Oki Electric Industry Co., Ltd. | 18 | ○ |
| 12 | Daiwa House Industry Co., Ltd. | 18 | ○ |
| 12 | Nippon Densetsu Kogyo Co., Ltd. | 18 | ○ |
| 16 | NEC Solution Innovators, Ltd. | 17 | |
| 16 | Tokyu Community Co. | 17 | ○ |
| 18 | Pioneer Corporation | 16 | ○ |
| 19 | NSD Co., Ltd. | 15 | ○ |
| 19 | Keihin Corporation | 15 | ○ |
| 21 | Minebea Co., Ltd. | 14 | ○ |
| 21 | SMC Corporation | 14 | ○ |
| 21 | NTT Data Corporation | 14 | ○ |
| 21 | TS Tech Co., Ltd. | 14 | ○ |
| 21 | Yahoo Japan Corporation | 14 | ○ |
| 26 | Kyosan Electric Manufacturing Co., Ltd. | 13 | ○ |
| 26 | Tokyo Electric Power Company Holdings, Inc. | 13 | ○ |
| 26 | Mitsubishi Electric Building Techno-Service Co., Ltd. | 13 | |

TDU was established in 1907 as a vocational school for young engineers, *Denki School*, pursuing the ideal of industrial education, and marks its 110th anniversary in 2017. TDU has been underpinning Japan's modernization for more than a century, and has been steadily building up its history and tradition with Japan's science and technology development. TDU has evolved into an educational and research institution operating in the field of science and technology. We incorporate 5 graduate schools, 6 undergraduate schools, a research facility, a junior and a senior high school, and a university press. We embrace a total student population of 11,300 and have sent over 210,000 talented graduates out into all walks of life.

Our founders, Seiichi Hirota and Shinkichi Ogimoto, held as the founding spirit of the University the desire to "promote and disseminate industrial education in Japan and strive to become a headquarters for science of the future through education that emphasizes practical study." This spirit still burns as the foundation for building not only TDU, but also Japan, which aims to transform itself into a science – and technology-intensive nation.

Our mission is to lead world society by educating people under our founding spirit, creating academic value, and contributing widely to the global community. We consider this to be the role of a university that is the focal point for building and passing down intelligence, wisdom, and knowledge to future generations.

TDU has always contributed to the development of communities, while holding high our founding ideals of fostering the growth of scientists and engineers truly useful to society. We are, however, not content to rest on our laurels. As we continue for another one hundred years, we shall create "our own new educational and research base," work harder toward fostering the growth of engineers filled with vitality, and further fulfill our responsibility to contribute to society around the world.

The first president of TDU, Yasujiro Niwa, believed that, "In the Technology Breathes its Creator." We will continue our educational principles that strive to create graduates possessing a proper sense of ethics, reflecting this motto as our guiding light, cherishing and carrying on the 110-year-old founding spirit of our institution that we inherited. We shall fulfill our mission to help turn Japan into a science – and technology-intensive country, and forge ahead with unwavering integrity. By accomplishing this mission, we will contribute to the global community.
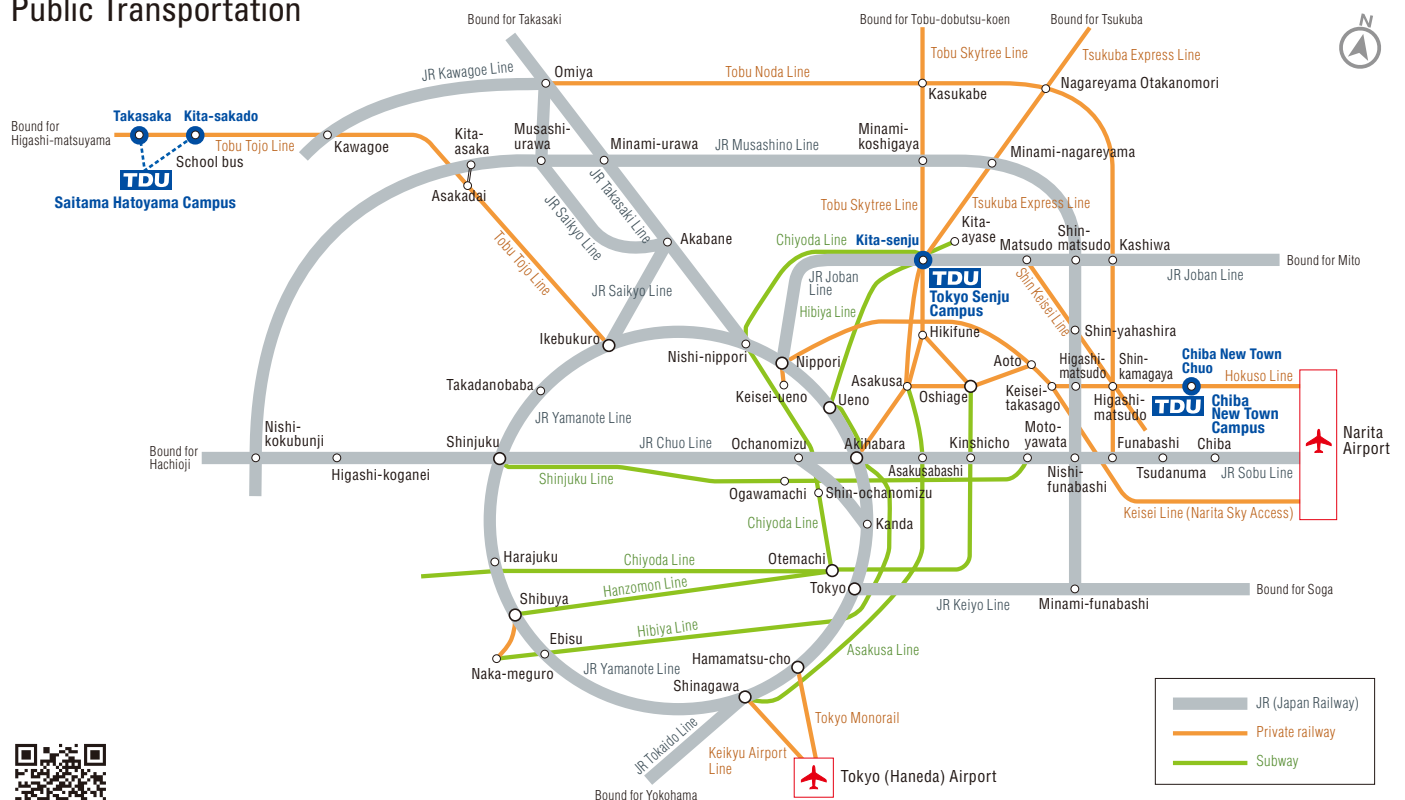
**Yasutaro Kato**
Chairperson, Board of Trustees
Tokyo Denki University

# Location and Directions



## Public Transportation



http://www.dendai.ac.jp/access/
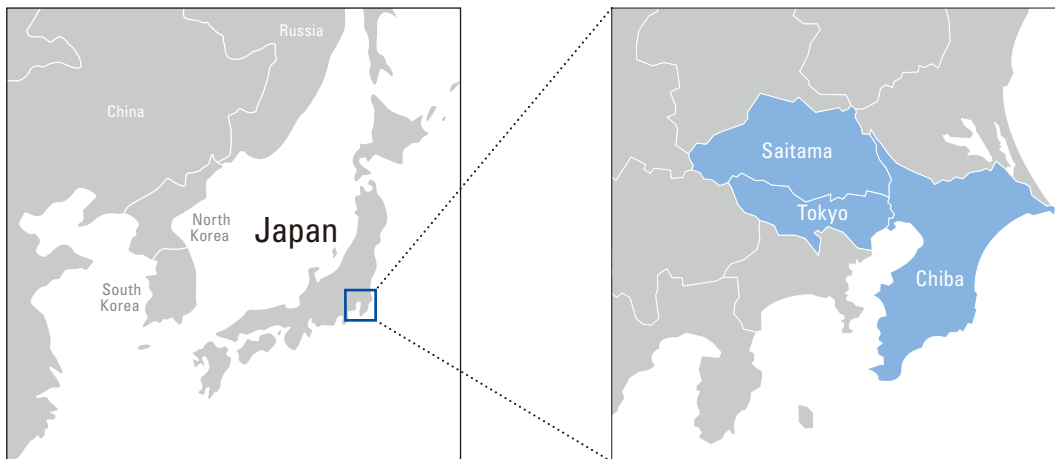
### Tokyo Senju Campus
**Nearest station:**
Kita-senju Station (JR Joban Line, JR Ueno-Tokyo Line,
Tokyo Metro Hibiya Line, Tokyo Metro Chiyoda Line,
Tobu Skytree Line and Tsukuba Express Line)
One-minute walk from the station
**Address:**
5 Senju Asahi-cho, Adachi-ku, Tokyo 120-8551

### Saitama Hatoyama Campus
**Nearest stations:**
Takasaka Station and Kita-sakado Station (Tobu Tojo Line)
Ten-minute school bus ride from both stations
**Address:**
Ishizaka, Hatoyama-machi, Hiki-gun, Saitama 350-0394

### Chiba New Town Campus
**Nearest station:**
Chiba New Town Chuo Station (Hokuso Line,
Keikyu Airport Line, and Narita Sky Access Line)
Ten-minute walk from the station
**Address:**
2-1200 Muzai Gakuendai, Inzai-shi, Chiba 270-1382

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