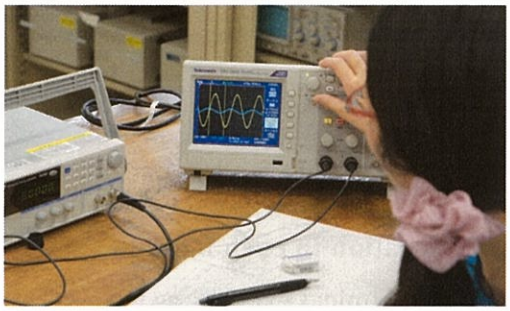



University of the Ryukyus

Bulletin

2014

Faculty of Engineering
Graduate School of Engineering and Science





About us

Dean Tomio Takara

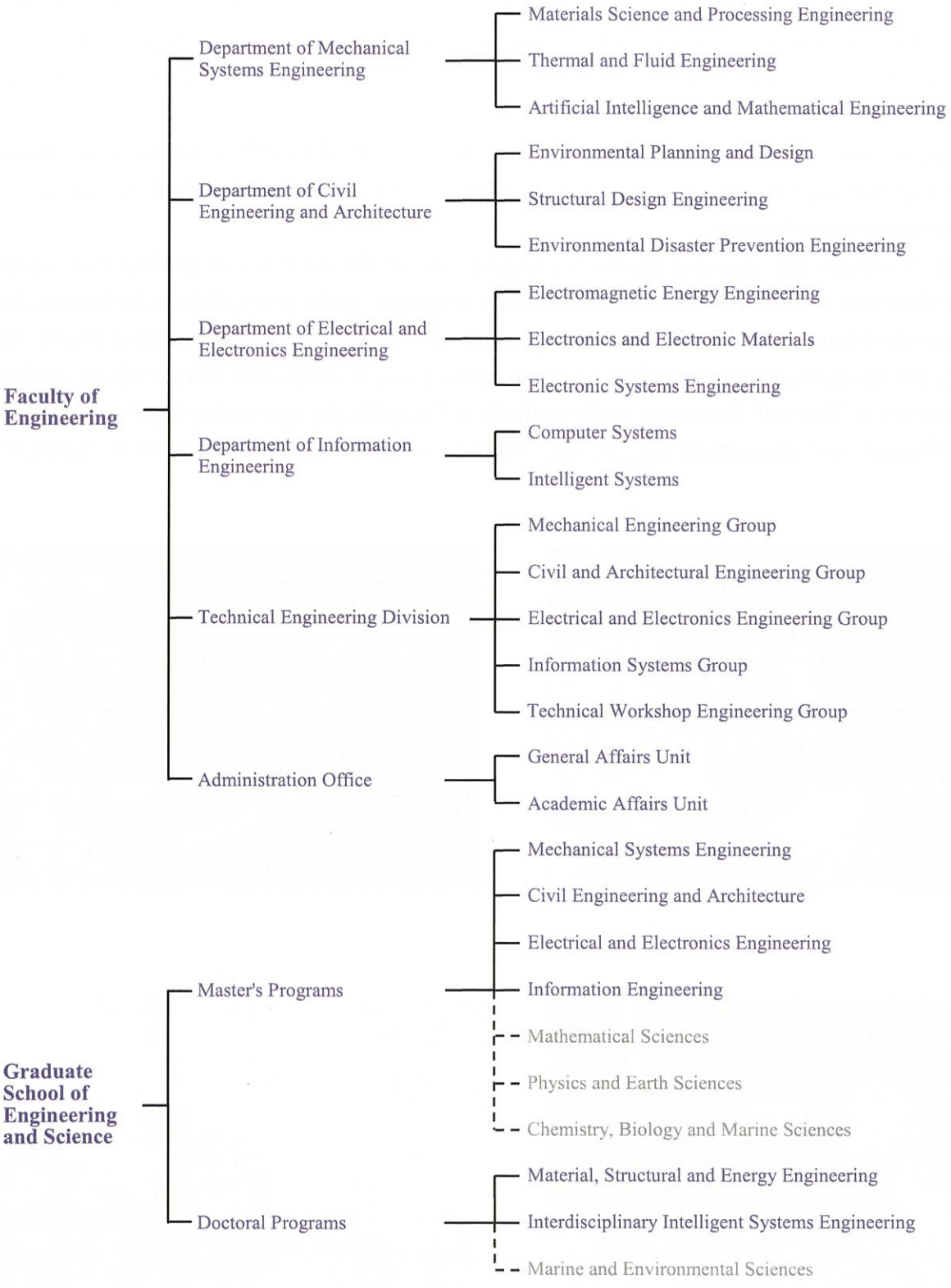
Universities are different from other educational organizations in that they carry out research activities. Universities provide education to the extent which humans possess such knowledge, and beyond such limits, universities engage in research. Research requires academic freedom, which is also known as the freedom of thought. Therefore, it is of utmost importance that you think freely and act of your own volition.

In engineering, all man-made objects in our surroundings may become subjects for research. As such, it is my opinion that the Japanese word for engineering, "kougaku," is an abbreviation of the word "jinkoukagaku," which means artificial systems science in English. This serves as a binary term for the concept of natural sciences. Engineering seeks to continually surpass the limits of human knowledge by carefully researching man-made objects through scientific methodology.

The Faculty of Engineering at University of the Ryukyus is organized into the departments of Mechanical Systems Engineering, Civil Engineering & Architecture, Electrical & Electronics Engineering, and Information Engineering. Through its world-class education in each field, the Faculty nurtures individuals who possess cultural refinement, the ethics of technical experts, as well as a high level of technical knowledge, who are able to contribute to society and the conservation of the local environment, and are creative and possess the power of execution.

In order to maintain a world-class education, organizations need to carry out high-level research. The engineering divisions of the Graduate School of Engineering & Science research beyond the limit of human knowledge in the engineering field by organizing doctoral programs which involve the majors of Material, Structural & Energy Engineering and Interdisciplinary Intelligent Systems Engineering, and master' s programs which involve the majors of Mechanical Systems Engineering, Civil Engineering & Architecture, Electrical & Electronics Engineering, and Information Engineering. The Graduate School has a special program using English as the official language. This program is for international students who come mainly from developing countries in the Asia-Pacific region.

Organization



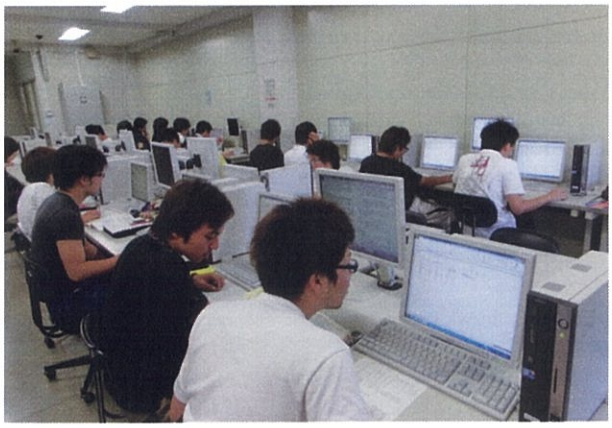
Department of Mechanical Systems Engineering

Mechanical Engineering forms the base for all branches of engineering. It includes the studies of imaging, manufacturing, and controlling of all types of machinery and instruments in our society and huge industrial machinery such as space exploration vehicles, as well as estimating the effects of machinery on the environment. The Mechanical Engineering Department consists of three divisions, which are Materials Science & Processing Engineering, Thermal & Fluid Engineering, and Artificial Intelligence & Mathematical Engineering. In addition to these divisions, there are studies on production systems and computer aided ones.

The undergraduate education program, which is fully accredited by JABEE (Japan Accreditation Board for Engineering Education), provides our students with international standard education level trials in mechanical engineering.

While freshmen take general education, engineering mathematics, and mechanics courses, second or third year students will take courses in their respective major in a well-branched curriculum in the three divisions. From these courses, the students will acquire a well-rounded knowledge necessary for an engineer or researcher. In their senior year, students will start working on their graduation theses. They will then learn study methods and acquire an engineering sense.

The Department also offers scheduling evening course for students who work during the daytime.



Personal Computer Software Practice

Experimental Test for Material Strength

Curriculum of Engineering Design

3kW horizontal wind turbine generator with three variable pitch blades

Department of Civil Engineering and Architecture

The mission of the Department of Civil Engineering and Architecture is to develop human resources for civil engineers and architects who possess extensive knowledge and skills as well as a feeling of social contribution through sustainable development and conservation of global and local environments. The department consists of two educational courses and three academic divisions.

The two educational courses are the Civil Engineering Course and the Architecture Course. Each student must select one course at the entrance examination stage. The students are required to take technical subjects together with liberal arts from their first year.

The three academic divisions are Environmental Planning and Design, Structural Engineering and Design, and Environmental Disaster Prevention Engineering. The faculty members are actively engaged in research activities and provide related technical subjects based on these academic divisions.

Civil Engineering Course

The Civil Engineering Course is comprised of five educational and research divisions, specifically, Infrastructure Planning, Structural Engineering, Concrete Engineering, Coastal Engineering, and Geotechnical Engineering.

The students join one of the research groups headed by supervisors of the divisions mentioned above and prepare a graduation thesis on a chosen topic of research in their final year.

The Japan Accreditation Board has certified the Civil Engineering Course educational program under its Japan Accreditation Board for Engineering Education (JABEE) Quality System so that the graduates are qualified with the international standards of education in civil engineering upon graduation.

Students who graduate from this program become exempt from the first-stage of examinations for professional engineer licenses.

On-site inspection

Concrete technology class

Architecture Course

The Architecture Course offers education and research opportunities in the following six fields: Architectural Planning and Design, Urban and Regional Planning, Urban and Architectural Environmental Engineering, Seismic and Building Structure Engineering, Building Construction Material Science, and Foundation and Disaster Prevention Engineering.

Each student is assigned to one research laboratory organized by a faculty member based on his/her requests to be involved in research work or an architectural design project for his/her graduate thesis in his/her final year. The graduates of the Architecture Course qualify to take examinations for the second-class architect license and for the first-class license after two or three years of practical experience.

Architectural design assignment

Seismic strengthening test

Department of Electrical and Electronics Engineering

Technologies in the electrical and electronics engineering fields form the infrastructure of information and communication technology, which supports all aspects of human activities. The technologies are also an engine of economic growth, and innovative research and human resources development in this field are always required. Because of these social demands, the Department of Electrical and Electronics Engineering focuses on education for the development of expert engineers who are active internationally and possess flexible minds and broader viewpoints.

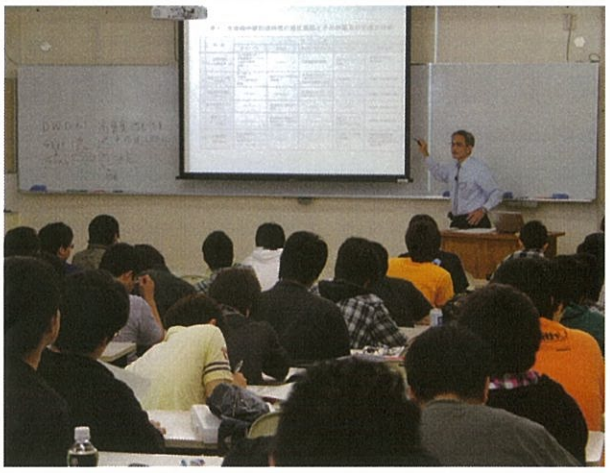
The educational program of this department has been accredited by the Japan Accreditation Board for Engineering Education (JABEE) in the fields of electrical, electronics, and communications engineering since 2006. In this program, general and foundational education and specialized education are well-organized and balanced so that students can acquire a broad perspective and flexible thinking. The department emphasizes practical learning through laboratory experiments, problem-solving researches, and computer programming to obtain an ability to provide solutions for actual problems.

The Department also offers scheduling evening course for students who work during the daytime.

Power Electronics Experiment

Hall Effect Experiment

Mobile Robot Experiment



Lecture

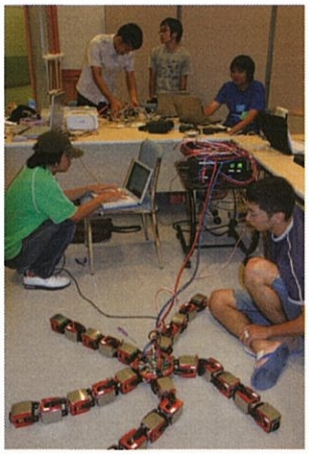
Department of Information Engineering

In the information age, computer technology plays an important role in every aspect of our society. Information technology-related industries are promoted as the leading technology of Okinawa in the 21st century.

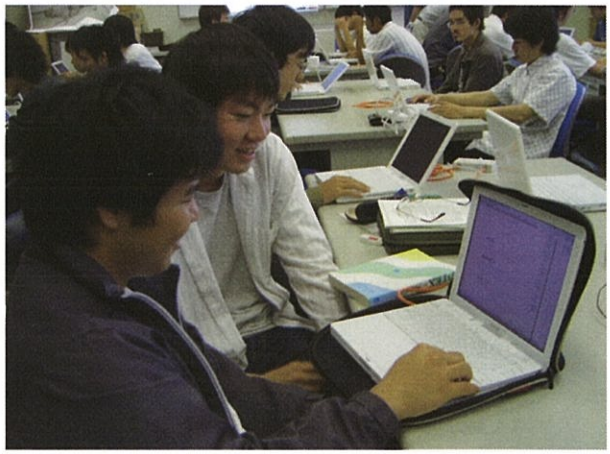
The Department of Information Engineering consists of the Computer Information System and Intelligent Information System divisions, where students can study a unique combination of curriculums comprising of practical computer hardware, software, information networks, and complex system engineering. There are six educational courses: Computer System Engineering, Information and Communication, Software Engineering, Intelligent Information Processing, Artificial Intelligence, and Intelligent Control.

During their studies in our department, first year students develop their own activities and creativity. Specifically, each student can gain a thorough comprehension of computers and study their practical uses. In their second year, students make out the major subjects and experimental studies concerning with most of the origin and practical computer engineering. Furthermore, most of the seminars are comprised of discussions and writing, and all seminars provide opportunities for individual expression and intellectual exploration. In their third year, students engage in one-year projects to create practical VLSI designs, robotics, multimedia entertainment signal processing and intelligent information system products. Fourth year students join various research projects such as communication systems, signal processing, artificial intelligence, intelligent robotics, software engineering, and high performance computing. The Department of Information Engineering also provides general culture courses during the four years of education to develop knowledge in more general areas.

For more information, please visit http://ie.u-ryukyu.ac.jp/.



Multipod robot

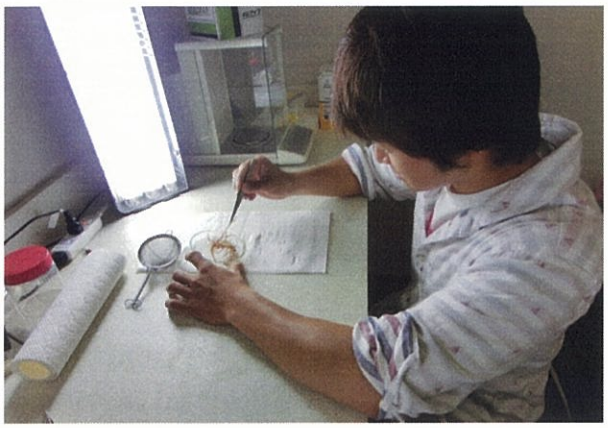


Information engineering experiments

Master's Program (Engineering Division)

Mechanical Systems Engineering Course

The Mechanical Systems Engineering Course consists of three divisions: Design, Analysis and Processing of Engineering Materials, Thermal and Fluid Engineering, and Artificial Intelligence and Mathematical Engineering. The course trains students to become professional engineers and researchers with advanced knowledge and techniques in the fields of materials, energy, dynamics, control, and processing.



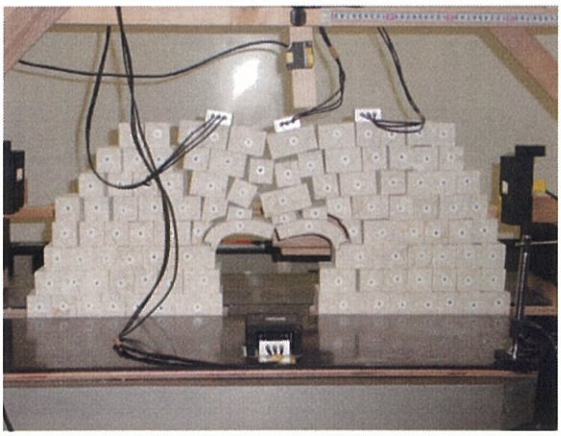
Stabilization of carbon dioxide and the development of a new energy source through the use of marine biomass

Atmospheric corrosion test for several metals

Civil Engineering and Architecture Course

The Civil Engineering and Architecture Course is committed to the education of highly specialized civil engineers, architects, and researchers. The course has specialized programs in the creativity of living spaces, development and maintenance of infrastructure, harmonious coexistence between nature and human beings, protection of communities against natural hazards, and active cooperation with local and international communities.

The course offers educational and research opportunities in the following three divisions: Environmental Planning and Design, Structural and Material Engineering, and Environmental Disaster Prevention Engineering.



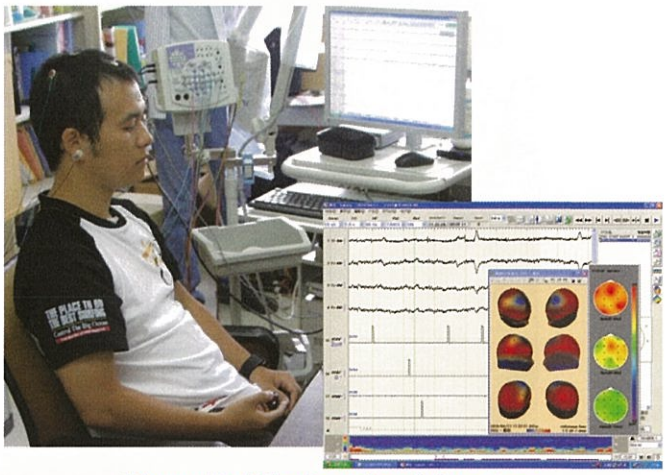
An experiment on the seismic response of stone masonry arch structures using a shaking table

Ultimate shearing test of stainless steel plate girders

Electrical and Electronics Engineering Course

The Electrical and Electronics Engineering Course is made of three divisions: Electromagnetic Energy Engineering, Electronic Materials Engineering, and Electronic Systems Engineering, where students and young professional engineers are provided with advanced knowledge and up to date techniques in those fields.

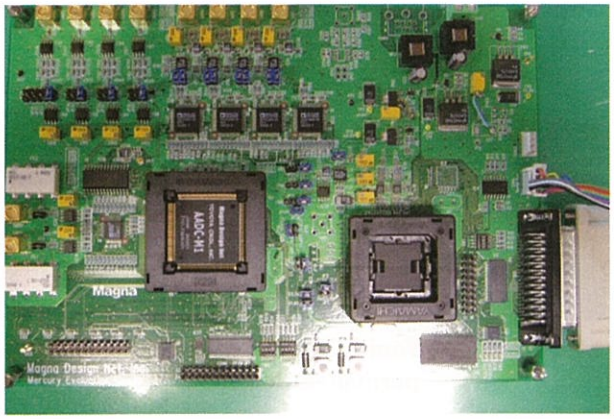
Semiconductor Devices Laboratory



Biomedical Engineering Laboratory

Information Engineering Course

The Information Engineering Course has two divisions: Computer Systems and Intelligent Systems. The studies in each range from hardware to software. Students can develop their talents of research and development to adapt to a technological society which consists of human intelligence, computers, communication networks, and media.



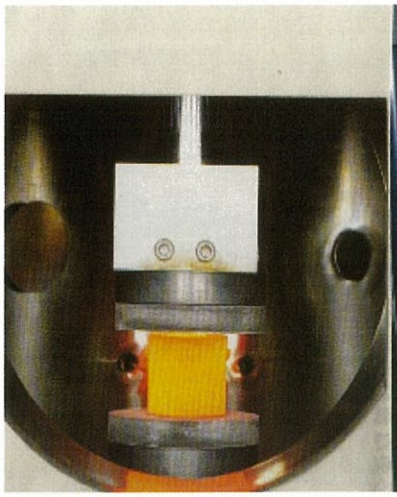
Terrestrial Mobile TV Receiver Demo System

VLSI Design CAD System

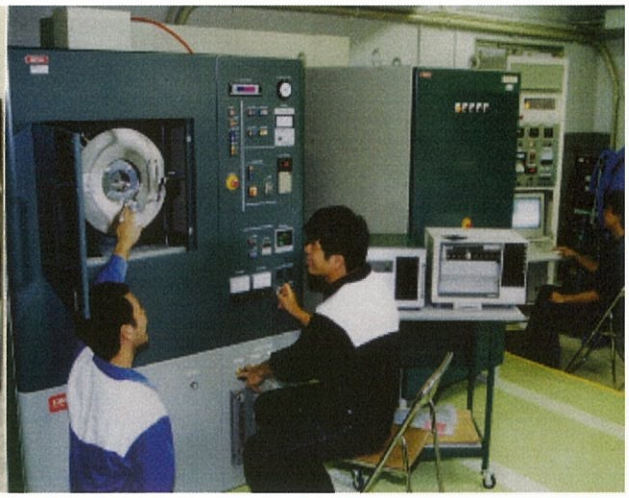
Doctoral Program (Engineering Division)

Material, Structural and Energy Engineering

This course consists of two divisions: Processing Development Engineering and Energy Development Engineering. Education and research in the Divisions are in the fields of intelligent materials, design and processing, thermal and fluid transfer, energy conversion, seismic performance and durability, and ocean development.



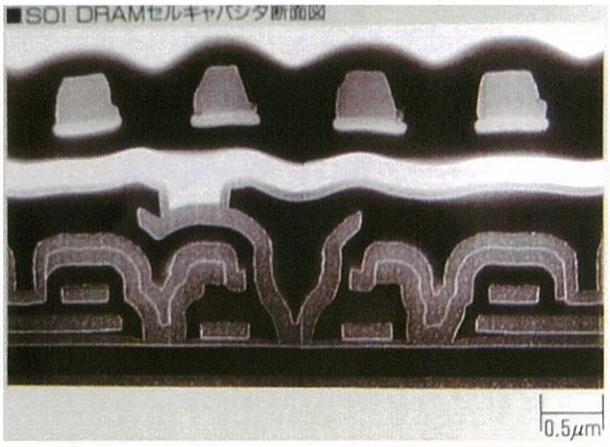
Sintering Process



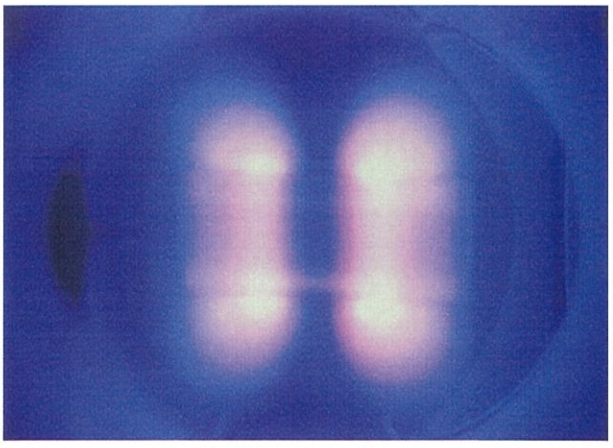
Manufacturing of functionally graded materials by spark plasma sintering

Interdisciplinary Intelligent Systems Engineering

Two divisions of this course, Environmental and Information Engineering and Electronics and Information Engineering, offer education and research in the fields of urban environmental design, intelligent design and planning technology for the living environment, intelligent systems engineering, electric and electronic systems, intelligent robotics, and control and information engineering.



A SEM photograph of SOI DRAM cell capacitors



Luminescence from ECR plasma of N2 gas around permanent magnets

The description of the Science Division of the Program is omitted

Technical Engineering Division

Technical Engineering Division was established in April , 2008. It consists of five groups: Mechanical Engineering Group, Civil and Architecture Engineering Group, Electrical and Electronics Engineering Group, Information System Group and Technical Workshop Engineering Group.

The Mechanical Engineering Group supports analyses of the processing of metal materials, fluid experiments, and experiments of internal-combustion engine. The Civil and Architectural Engineering Group supports analyses of soil, experiments of seismic retrofit, surveying practices. The Electrical and Electronics Engineering Group supports electrical experiments, developments of robots, and device control by computers. The Information System Group is primarily involved in the support services department of information engineering, supporting the experiment of information engineering, server administration, and programming. In addition, we provide project-based learning, and project management, and lectures. The Technical Workshop Engineering Group produces machine tools to support MONOZUKURI (manufacturing).

For the faculty and all the departments' administrations, we assist the open campus event, entrance and graduation ceremonies, and office work of all the departments. We successfully continue to participate in department meetings as we did even before establishment of the new system.

Other than these five groups, there are an education support team, a public relation team, a management and an evaluation team, and a training project team that the Technical Engineering Division organizes in order to support education and research activities as smoothly as possible by cooperating with each other.

Practice of milling machine

Scenery of a safety training program

Experiments of seismic retrofit

IT system design workshop

Special Graduate Programs for International Students

The Graduate School of Engineering and Science offer the following special graduate programs for international students:

Master's program	Mechanical Systems Engineering, Civil Engineering and Architecture, Electrical and Electronics Engineering, Information Engineering
Doctoral program	Material, Structural and Energy Engineering Interdisciplinary Intelligent Systems Engineering

It is the special features of these programs that we teach all classes and researches in English, and the academic year begins on October and April.

We accept students who are interested in this special graduate program from Asian countries and Pacific Island countries as well as all over the world. And we promote academic and researchers exchange between these countries. Furthermore, this graduate school is progressing as the central institute not only domestically but also internationally by researching many problems and issues in tropical and subtropical countries.

International Students by Nationality

As of May 2014

Countries	Undergraduate		Graduate		Research and Auditor Student		Total	
	Japanese Gov. Scholarship	Private	Japanese Gov. Scholarship	Private	Japanese Gov. Scholarship	Private	Japanese Gov. Scholarship	Private
Afghanistan				13				13
Bangladesh			2	1			2	1
Bulgaria		1						1
China		16		6				22
Taiwan		1						1
Korea		1				2	1	2
Sri Lanka			1	1			1	1
Fiji			1				1	
Indonesia				2				2
India			1	1			1	1
Laos		1						1
Malaysia		1						1
U.S.A.				3				3
Mexico				1	1		1	1
Algeria			1				1	
Argentina			1				1	
Tanzania			2				2	
Thailand			1				1	
Vietnam			1	1			1	1
Total		21	11	29	1	2	13	51

The Number of Students

As of May 2014

Faculty of Engineering

Departments		Admission Capacity	Enrolled Students
Mechanical Systems Engineering		110	492
Civil Engineering and Architecture	Civil Engineering Course	45	209
	Architecture Course	45	192
Electrical and Electronics Engineering		90	393
Information Engineering		60	294
Total		350	1,580

Graducate School of Engineering and Science

(Master's Program)

Courses	Admission Capacity	Enrolled Students
Mechanical Systems Engineering	27	46
Civil Engineering and Architecture	24	38
Electrical and Electronics Engineering	24	62
Information Engineering	18	50
Total	93	196

(Doctoral Program)

Courses	Admission Capacity	Enrolled Students
Material, Structural and Energy Engineering	4	19
Interdisciplinary Intelligent Systems Engineering	3	23
Total	7	42

Faculty Level Exchange

As of September 2014

Name of University	Country/Area	Date Of Signing	Purpose of Agreement	
			Academic exchange	Student Exchange
University of Tehran	Iran	10.26.1998	○	○
Fuzhou University	China	3.1.1999	○	○
University of Sao Paulo	Brazil	3.29.2000	○	○
Hanoi University of Technology	Vietnam	12.5.2007	○	○
National Taiwan University of Science and Technology	Taiwan	9.15.2008	○	○
Hoseo University	Korea	9.4.2009	○	○
Chungbuk National University	Korea	6.10.2010	○	○
Dalian Polytechnic University	China	11.30.2010	○	○
Sungkyunkwan University	Korea	2.14.2011	○	○
Center of Excellence,university of Computer Study,Yangon	Myanmar	9.24.2014	○	○

University Level Exchange

As of September 2014

Name of University	Country/Area	Name of University	Country/Area
Michigan State University ,University of Guam, University of Hawaii ,University of California, Davis, University of Nevada,Reno,	U.S.A	Central South University of Forestry and Technology, Fujian Normal University ,Yunnan Agricultural University, Huazhong University of Science & Technology Yanbian University ,	China
University of Canberra, James Cook University	Australia		
College of the Marshall Islands	Marshall Islands	Keimyung University ,Jeju National University, Sunchon National University ,Yonsei University, Mokpo National University, University of Seoul	Korea
Palau Community College	Palau	Chulalongkorn University,Thammasat University, Khon Kaen University,Chiang Mai University, King Mongkut' s Institute of Technology Ladkrabang	Thailand
University of Papua New Guinea	Papua New Guinea	Sam Ratulangi University, Bogor Agricaultural University, Diponegoro University	Indonesia
National University of Samoa	Samoa	Vietnam National University ,Hanoi, Vietnam National University-Ho Chi Minh City, Thai Nguyen University	Vietnam
University of New Caledonia	New Caledonia	National Taiwan University, National Taiwan Ocean University, National Sun Yat-Set University,Tunghai University	Taiwan
The University of the South Pacific	Fiji	National University of Laos, University of Health Science,Lao PDR	Laos
College of Micronesia-FSM	Micronesia	Université Lille 1 Sciences et Technologies, Ecole Pratique des Hautes Etudes,Universite de Toulouse-Le Mirail Universite Toulouse 1 Capitole	France
Atenisi University	Tonga	The University of Sheffield	U.K.

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