平成２５年度

大学院工学研究科
博士前期課程
博士後期課程

工学研究科ホームページ：http://www.eng.chiba-u.ac.jp
千葉大学ホームページ：http://www.chiba-u.jp

To promising young people, let’s cultivate the power to learn and produce, in order to succeed in the world

Akihide Kitamura,
Dean of the Graduate School of Engineering, Chiba University

At Chiba University, our graduate program has been organized into four graduate schools based on three areas; science, engineering and horticulture. The engineering area is part of the Graduate Schools of “Engineering” and “Advanced Integration Science.” The Graduate School of Engineering is grouped into four divisions; Architecture and Urban Science, Design Science, Artificial Systems Science and Applied Chemistry and Biotechnology. Each division is based on a course curriculum. These courses are divided into core engineering areas, which include the Departments of Architecture, Design Science, Electrical and Electronic Engineering, Applied Chemistry and Biotechnology, and composite and advanced engineering areas, which include the Departments of Urban Environment Systems and Medical Systems. Each division is closely linked to the Nanoscience and Information Science Divisions of the Graduate School of Advanced Integration Science through interrelated course coordination, which provides opportunities to learn the importance of cutting-edge interdisciplinary aspects.

Our Graduate School of Engineering provides a systematic approach to coursework, allowing individuals to acquire a broad range of advanced knowledge and skills that are needed by our society and is not limited to narrow areas of research such as training for highly-specialized professionals. Furthermore, the Graduate School not only cultivates accumulated specialized knowledge and research skills but also fosters individuals with a rich sense of humanity who can accept social responsibilities based highly developed ethics.

Admissions Policy
Chiba University Graduate School of Engineering

1. Students welcome at Chiba University Graduate School of Engineering

   Chiba University Graduate School of Engineering seeks to admit individuals with high ethical standards who aspire to contribute to the development of society on the basis of a systematic understanding of the natural sciences as specialists for applicants for a master's program, and as pioneering researchers for applicants for a doctoral program.

2. Basic policy on student selection

   To select students compatible with its educational principles and policies, Chiba University Graduate School of Engineering conducts entrance examination procedures. For master's programs, we evaluate applicants' qualities and abilities holistically on the basis of their transcript of grades, an oral examination, a scholastic achievement test and an interview, and for doctoral programs, we evaluate them on the basis of their transcript of grades and an oral examination about their master's degree thesis and research proposal.

【Master's Programs】

(1) Division of Architecture and Urban Science

① Department of Architecture

a. Students welcome in the Department of Architecture

We seek to admit individuals who aspire to assume a broad perspective in regard to architecture and urban science and master in-depth knowledge in specific fields of architecture; work as highly specialized engineers; and utilize architecture, which integrates comprehensive knowledge and technology, to engage in practice.

b. Basic policy on student selection

The Department of Architecture evaluates applicants' qualities and abilities holistically on the basis of tests on broad-based fundamental knowledge pertinent to architecture, English and subjects pertaining to a number of specific specialized areas.

② Department of Urban Environment Systems

a. Students welcome in the Department of Urban Environment Systems

We seek to admit individuals who aspire to acquire knowledge in the specialized fields of urban spatial planning, urban infrastructure engineering, urban environmental engineering and urban information engineering with the aim of creating an "urban concept" befitting the 21st century and building prosperous "cities" in harmony with the natural environment; and to use their creativity to tackle various problems facing modern cities.

b. Basic policy on student selection

To select students compatible with the educational principles and objectives of this department, we evaluate applicants' abilities and qualities holistically on the basis of our

entrance examination procedures which encompass their transcript of grades, an oral examination, a scholastic achievement test and an interview.

(2) Division of Design Science

① Department of Design Science

a. Students welcome in the Department of Design Science

We seek to admit progressive pioneering individuals who aspire to acquire a high level of expertise in basic design and its applications, and realize a better lifestyle and society by engaging in problem solving independently, creatively and unrestrained by existing values on the basis of an understanding of a broad range of design field and collaboration with other field.

b. Basic policy on student selection

To select students compatible with the educational principles and policies of our department, we evaluate applicants' qualities and abilities holistically on the basis of their transcript of grades, an oral examination and a scholastic achievement test.

(3) Division of Artificial Systems Science

① Department of Mechanical Engineering

a. Students welcome in the Department of Mechanical Engineering

We seek to admit individuals who are full of intellectual curiosity and passion for advancing learning on mechanical engineering and aspire to acquire broad-ranging specialized knowledge of mechanical engineering and contribute to international society.

b. Basic policy on student selection

The Department of Mechanical Engineering aims to train human resources with a deep understanding of specialized subjects pertaining to *monozukuri* (manufacturing) and the ability to participate widely in society. Accordingly, we evaluate applicants' qualities and abilities holistically on the basis of a number of factors including a scholastic achievement test and an interview designed to measure their specialized knowledge in the field of mechanical engineering, their ability to apply it and their desire to learn.

② Department of Electrical and Electronic Engineering

a. Students welcome in the Department of Electrical and Electronic Engineering

We seek to admit individuals who empathize with the social mission of electrical and electronic engineering and strongly aspire to contribute to the development of such technologies. In particular, in order to foster specialized knowledge and skills in these fields, we seek to admit motivated individuals with basic competencies.

b. Basic policy on student selection

As mentioned above, the Department of Electrical and Electronic Engineering administers a scholastic achievement test and an interview to determine whether applicants have the basic education and desire to learn required to acquire specialized knowledge and abilities in the

fields of electrical and electronic engineering. We evaluate applicants' qualities and abilities holistically on the basis of their results.

③ Department of Medical System Engineering

a. Students welcome in the Department of Medical System Engineering

To realize improvements in medical care, health and welfare, a basic desire of mankind, through research and development of equipment and technologies in the interdisciplinary areas of medicine and engineering, we seek to admit individuals with the passion and drive needed to advance medical engineering.

b. Basic policy on student selection

To select students compatible with the educational principles and policies of this department, we evaluate applicants' abilities and qualities holistically on the basis of our entrance examination procedures which encompass their transcript of grades, an oral examination, a scholastic achievement test and an interview.

(4) Division of Applied Chemistry and Biotechnology

① Department of Applied Chemistry and Biotechnology

a. Students welcome in the Department of Applied Chemistry and Biotechnology

We seek to admit individuals with a fundamental knowledge of fields of natural science founded in chemistry, and a strong desire to learn about sustainable chemistry and related technologies, and make use of resulting outcome to contribute to the development of society.

b. Basic policy on student selection

To select students compatible with the educational principles and objectives of this department, we evaluate applicants' qualities and abilities holistically on the basis of their transcript of grades, and the results of an oral examination and a scholastic achievement test.

【Doctoral Programs】

(1) Division of Architecture and Urban Science

① Department of Architecture

a. Students welcome in the Department of Architecture

We seek to admit individuals with a desire to build on broad-based learning in architecture and urban science by mastering in-depth knowledge in specific fields of architecture and work as full-time researchers or engineers; and the passion to build and develop a cutting-edge advanced-level knowledge base through logical and flexible thinking.

b. Basic policy on student selection

We evaluate applicants' qualities and abilities holistically by administering an oral examination to confirm they have the communication skills needed for discussion of specialized research, the social and academic significance of their doctoral research proposal and its potential for development as research.

② Department of Urban Environment Systems

a. Students welcome in the Department of Urban Environment Systems

We seek to admit individuals with a strong desire to cultivate the insight and intellect needed to accurately grasp various issues in modern cities on the basis of profound expertise and the ability to conceptualize and execute plans with a view to envisaging and realizing solutions as researchers dedicated to creating an "urban concept" befitting the 21st century and building prosperous "cities" in harmony with the natural environment.

b. Basic policy on student selection

To select students compatible with the educational principles and objectives of this department, we evaluate applicants' abilities and qualities holistically on the basis of our entrance examination procedures which encompass a scholastic achievement test (oral examination) and their transcript of grades.

(2) Division of Design Science

① Department of Design Science

a. Students welcome in the Department of Design Science

We seek to admit individuals who aspire to become design engineers or researchers capable of integrating the latest knowledge in various field of design science, playing a guiding role in this area, responding to myriad sophisticated challenges, and developing unexplored field in design science.

b. Basic policy on student selection

To select students compatible with the educational principles and policies of our department, we evaluate applicants' abilities and qualities holistically on the basis of a scholastic achievement test (oral examination) and their transcript of grades.

(3) Division of Artificial Systems Science

① Department of Mechanical Engineering

a. Students welcome in the Department of Mechanical Engineering

We seek to admit individuals with advanced specialized knowledge pertaining to a broad range of academic areas founded in mechanical engineering, the ability to find solutions to problems in cutting-edge research and development and put them into practice, and the desire to contribute to international society.

b. Basic policy on student selection

With a view to training human resources to engage in cutting-edge research and development based on mechanical engineering, the Department of Mechanical Engineering evaluates applicants' qualities and abilities holistically by administering a number of procedures including a scholastic academic test and an interview to determine whether they have advanced specialized knowledge, the ability to resolve problems, and the ability and desire to persevere and succeed.

② Department of Electrical and Electronic Engineering

a. Students welcome in the Department of Electrical and Electronic Engineering

We seek to admit individuals who empathize with the social mission of electrical and electronic engineering and have the ability and drive to fully utilize specialized knowledge in these fields and their ability to apply it to contribute to development of those technologies and engage in research independently.

b. Basic policy on student selection

As mentioned above, the Department of Electrical and Electronic Engineering administers a scholastic achievement test and an interview to determine whether applicants have mastered specialized knowledge in the fields of electrical and electronic engineering and the ability to apply it, and have the ability and drive to engage in research on their own. We evaluate applicants' qualities and abilities holistically on the basis of their results.

③ Department of Medical System Engineering

a. Students welcome in the Department of Medical System Engineering

To realize improvements in medical care, health and welfare, a basic desire of mankind, through advanced research and development of equipment and technologies in the interdisciplinary areas of medicine and engineering, we seek to admit individuals with the passion and drive needed to advance medical engineering.

b. Basic policy on student selection

To select students compatible with the educational principles and policies of this department, we evaluate applicants' abilities and qualities holistically on the basis of our entrance examination procedures which encompass their transcript of grades, an oral examination and an interview.

(4) Division of Applied Chemistry and Biotechnology

① Department of Applied Chemistry and Biotechnology

a. Students welcome in the Department of Applied Chemistry and Biotechnology

We seek to admit individuals with adequate knowledge of fields of natural science founded in chemistry and a strong desire to learn about sustainable chemistry and related technologies, and actively contribute to the development of society as pioneering researchers and engineers.

b. Basic policy on student selection

To select students compatible with the educational principles and objectives of this department, we evaluate applicants' abilities and qualities holistically on the basis of their transcript of grades and an oral examination. In the oral examination, we ask questions about a number of factors including the applicant's master's degree thesis and their research proposal, and evaluate their abilities and qualities holistically on the basis of this, their knowledge of research and desire to engage therein, and their ability to plan research.

Policy on the Conferment of Degrees
Chiba University Graduate School of Engineering

【Master's Programs】

Individuals must have acquired the knowledge and capabilities described below beyond the foundation of their bachelor's degrees to be eligible for conferment of master's degrees.

- "The spirit of freedom and independence"
  Individuals must have systematic understanding of natural science as independent engineering specialists and as personnel with highly intelligent grounding that support knowledge-based society.
  Individuals must be able to take initiative by following the social norm, utilizing acquired knowledge and flexible thinking ability.

- "Involvement in society from a global perspective"
  Individuals must have understanding of diversified domestic and international cultures, values, societies, nature and environment, and have flexible thinking and communication ability from the global perspective necessary to coordinate with society as specialists.

- "Specialized knowledge, skills and abilities"
  Individuals must possess broad and high level of specialized knowledge not only in their major field of study but also in interdisciplinary areas in comprehensive and systematic manners. Individuals must have acquired ability to take initiative to solve the issues based on the flexible and logical thinking and deep insight.

- "Excellent problem-solving skills"
  Individuals must be able to solve the issues that require highly specialized engineering knowledge and state-of-the-art technology by integrating and organizing the knowledge of related fields and by taking a lead in sharing and cooperating with others.

【Doctoral Programs】

Individuals must have acquired the knowledge and capabilities described below beyond the foundations of their bachelor program, master's program and first stage doctoral program to be eligible for doctoral programs.

- "The spirit of freedom and independence"
  As students who aspire to become researchers or university faculty members that play a central role in various research and educational institutes of industry or government, individuals must be able to set up their own research projects in engineering field and able to conduct independent research activities.

- "Involvement in society from a global perspective"
  Individuals must have global perspective, and be able to set up their own research themes and independently perform research and development in liaise with society in and outside of Japan. And they must be able to present the research result interdisciplinary and internationally. Individuals must have understanding of various cultures and history so that they are able to act as leaders at domestic and

international educational/research organizations.

- “Specialized knowledge, skills and abilities”
  Individuals must have acquired creative research and development ability based on the high level of knowledge in their specialty, and be able to contribute to new findings. Individuals must be able to develop the leading research using the broad range of specialized knowledge, and be able to plan and administer research and development projects.

- “Excellent problem-solving skills”
  Individuals must be able to take a lead in coordinating and cooperating with others by sharing the information and knowledge of their specialty. Individuals must be able to conduct highly sophisticated and original intellectually creative activities that support a knowledge-based society.

Policy on the Formulation and Implementation of Education Curriculum
Chiba University Graduate School of Engineering

【Master's Programs】

- To uphold "the spirit of freedom and independence"
  - Formulate and provide educational curricula that enable students to acquire wide-ranging knowledge in engineering basics as natural science and technology basis, and encourage the students to study and research proactively using their own judgment and following their own plan, throughout all educational curricula to foster flexible thinking and deep insight.
  - Provide practical educational opportunities to put students' own knowledge, thinking and insight into action as engineering specialists.

- To embrace "involvement in society from a global perspective"
  - Provide curricula so that the students can acquire extensive knowledge including engineering ethics and study from global perspective, while understanding social and academic position of their specific areas of expertise.
  - Provide opportunities to acquire communication ability so that the students can effectively convey their specialized knowledge to people with other specialty and various backgrounds.

- To acquire "specialized knowledge, skills and abilities"
  - Provide systematic education that cultivate in-depth knowledge in students' respective area of expertise as well as practical education to utilize knowledge to solve problems.
  - Provide opportunities for the students to understand the relationship of their own major filed of study with other fields through inter-divisional open enrollment, as well as opportunities to acquire extensive and highly specialized knowledge.

- To nurture "excellent problem-solving skills"
  - Provide research-education opportunities so that students can work on the projects by integrating and organizing the specialized knowledge and cultivate the problem solving ability. Also provide the curricula so that students can acquire the ability to solve the issues by cooperating with others while taking into account the intellectual property rights and information ethics.
  - Provide opportunities such as internship and cultivate hands-on ability in order to nurture practical problem solving ability.

【Doctoral Programs】

- To uphold "the spirit of freedom and independence"
  - Provide curricula so that students can acquire the ability as independent researchers by continuously self-evaluating their consistent research activities from project setting to result presentation.

- To embrace “involvement in society from a global perspective”
  - Provide curricula so that students understand the problems in their field of specialization from a global perspective and consider what kind of research and development is necessary to find solutions for such problems and contribute to a society.
  - Provide opportunities for the students to explain their own research results to and exchange information with overseas specialists and people in different fields of expertise by associating with the latest research trend.
  - Provide opportunities to understand the diversity of domestic and international cultures and history and to interact with a variety of people.

- To acquire “specialized knowledge, skills and abilities”
  - Provide opportunities for the students to be proactively involved in the creation of new finings and values in preparation for their dissertation study.
  - Provide opportunities for the students to acquire management ability by actually keeping track of the progress of their dissertation study starting from research plan setting to result evaluation.

- To nurture “excellent problem-solving skills”
  - Provide opportunities to acquire the management skill so that students can share the information and knowledge of specialized fields with co-researchers and research associates and take a leading role in carrying out the research for the preparation of their dissertation study.

IV. Overview of the Graduate School of Engineering

1. Educational Philosophy of the Graduate School of Engineering

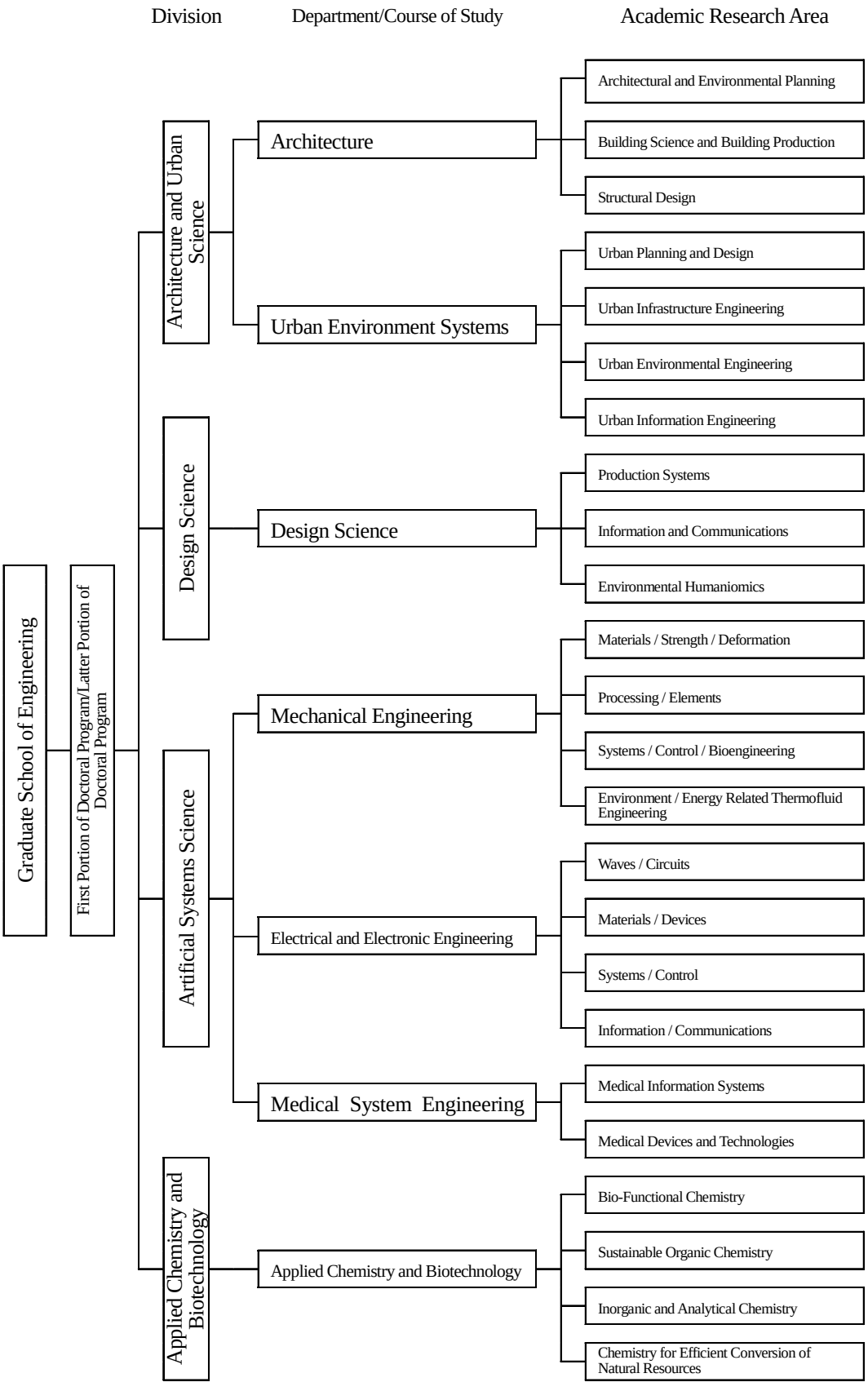
In recent years, engineering is of increasing importance as an academic discipline with practical applications that aims for the development of a rich society. There are many areas of engineering that are expected to yield technical innovations, such as residential environment design, robotics, IT technology, medical engineering, and biotechnology. However, the days of purely considering the development of science and technology as the sole purpose of engineering have come to an end. Modern engineering must be kind to people and to the environment as well as deal with increasing demands. The Graduate School of Engineering promotes educational research that is in line with this trend. The societal expectations for the development of highly specialized professionals demand a curriculum that is not limited to a narrow field of research, but provides systematic mastery of a wide range of advanced knowledge and skills. In terms of the development of researchers, societal expectations demand not only the cultivation of simple research skills, but also the cultivation of people who are compassionate and capable of fulfilling their social responsibilities.

The Graduate School of Engineering provides the kind of education required by modern society. It is comprised of the 4 divisions: Architecture and Urban Science, Design Science, Artificial Systems Science, and Applied Chemistry and Biotechnology. Each of the departments within these divisions offers courses of study within their respective fields of specialization. These courses of study are subdivided into curricula from the core engineering areas and composite or cutting edge engineering areas. Architecture, Design, Mechanical Engineering, Electrical and Electronic Engineering, and Applied Chemistry and Biotechnology curricula belong to the former area, while Urban Environmental Systems and Medical System Engineering curricula belong to the composite or cutting edge engineering areas. The highly specialized professionals and researchers that society demands are cultivated through this educational system. The Graduate School of Engineering recognizes the importance of cutting-edge, interdisciplinary approaches to education, implementing such approaches through its strong ties with the divisions of Nanoscience and Information Science in the Graduate School of Advanced Integration Science, where students from both Graduate Schools have the opportunity to earn course credit.

Students in the Graduate School of Engineering will be awarded the following degrees based upon completion of the credits required by the respective divisions for graduation, submission of the academic thesis or dissertation with the requisite research guidance and advising, and successful completion of the final exam and faculty review.

	First Portion of Doctoral Program	Latter Portion of Doctoral Program
Architecture and Urban Science	Master's (Engineering) or Master's (Academic)	Doctorate (Engineering) or Doctorate (Academic)
Design Science	Master's (Engineering) or Master's (Academic)	Doctorate (Engineering) or Doctorate (Academic)
Artificial Systems Science	Master's (Engineering) or Master's (Academic)	Doctorate (Engineering) or Doctorate (Academic)
Applied Chemistry and Biotechnology	Master's (Engineering) or Master's (Academic)	Doctorate (Engineering) or Doctorate (Academic)

Organizational Chart for the Graduate School of Engineering



1.1 Division of Architecture and Urban Science

Educational Philosophy of the Division of Architecture and Urban Science

The Division of Architecture and Urban Science provides a specialized educational foundation to cultivate specialized technicians and researchers on the various issues surrounding the individual architectural structures and environments that create cities and which serve as the foundation for human life, culture, and productive activities. It also cultivates high-level specialists capable of conceiving, planning, and designing architectural structures and urban environments that are safe, comfortable, attractive, and sustainable through research studies, experiments, and analyses.

Architecture and the urban environment surrounding it are greatly altered by social and economic changes as well as technological advances, yet have also created a sustained culture that has lasted through the ages. High-level specialists in this field are required to have an understanding of this two-sided aspect of the field as well as the ethics of a technician who will provide safety against natural disasters and fires and who has broad perspective with a concern for the environment. This division considers its keywords to be the harmony of cutting edge science, creativity, and social commitment, cultivating in its students the skills and ethics required of pioneering researchers, technicians, policymakers, and designers in architecture and the urban environment through academic research that is open to the region and to society.

The Division of Architecture and Urban Science is comprised of two courses of study: Architecture and Urban Environment Systems. The Department of Architecture specializes in the field of architecture, focusing on such aspects as the history, design, planning, environment, and structure of architecture. Meanwhile, the Department of Urban Environment Systems specializes in the field of comprehensive urban engineering, comprised of such elements as the planning, infrastructure, environment, energy, and information of urban spaces.

<Overview of the Course of Study in Architecture>

In order to cultivate highly specialized technicians and researchers in the field of architecture who will be successful not only in Japan but on the international stage, this course of study provides cutting edge, specialized education in respective fields of specialization of the history of architecture and cities, design/planning, architectural structure and disaster prevention, environment and facilities, and production (structural systems). This is not limited to merely the new construction of architectural structures using the latest technologies but also includes the functional reproduction, reproduction for the purposes of disaster prevention, and historical reproduction of past assets and properties.

Social Needs

Many students who have completed the first portion of the Doctoral program go on to work as highly specialized technicians involved with architecture in the offices of general contractors, design offices, governmental or public organizations, consultants, housing manufacturers, and manufacturers of building materials. Their roles involve architectural planning, architectural design and design-related roles, structural design of buildings, architectural facility design, or construction management. A defining characteristic of this course of study in architecture is that a majority of the graduates acquire the First Class Architects License. A number of graduates also acquire other licenses related to architecture according to their specialties, such as Concrete Engineer Certification, First Class Construction Management Engineer, and Interior Planner.

Students who have completed the latter portion of the Doctoral program go on to take leadership roles in their respective fields of specialization in architecture as pioneering technicians and cutting edge researchers at public institutions, research laboratories of private corporations, and public and private educational institutions. Many of the graduates who came as foreign exchange students return to their alma maters in their native country to launch successful

careers as faculty members. In addition, one of the defining characteristics of the course of study in architecture is exemplified in our graduates who have gone on to open their own design offices after working for several years in internship positions. Our graduates have successful careers both within Japan and overseas.

Characteristics of the Academic Program

The academic program in architecture is comprised of the design/planning areas, the engineering area, and common subjects. These correspond to the Facilities Design Program and Engineering Program, which are part of the undergraduate fields of specialization.

The first portion of the Doctoral program involves a systematic graduate school education that is in line with the fundamental education provided by the undergraduate Department of Architecture in the Faculty of Engineering. The purpose of this portion of the program is to cultivate highly specialized technicians with broad perspectives on architecture, which is a comprehensive academic discipline, and technology encompassing the history of architecture and cities, design/planning, the structure of buildings and disaster prevention, environment and facilities, and production of structural systems. The program also seeks to cultivate students who are capable of applying their comprehensive skills and academic knowledge in real-world settings. The course structure is closely tied to the 4th year of the undergraduate program, aiming to promote the 6-year integrated program with the undergraduate program. In addition, the curriculum is also in line with the Graduate School JABEE. In the field of design and planning in particular, students who have completed the first portion of the Doctoral program are given training that will allow them to qualify to take the international architects exam.

The latter portion of the Doctoral program mainly focuses on cultivating specialized researchers and technicians in the field of architecture. In terms of lectures, members of the faculty conduct highly specialized lectures on their specialty, which are held every other year in principle. The academic work in the latter portion of the Doctoral program is divided into the areas of design/planning and engineering, and is centered on research guidance by the individual advising professor or a group.

<Overview of the Course of Study in Urban Environment Systems>

The modern urban environment has various issues with communities, housing, landscape, under/overpopulation, disaster prevention, waste, recycling, pollution, communications networks, road networks, water sources, and energy. Meanwhile due to efforts at urban renewal and the progress of advanced information networks, cities are changing with the times. This course of study aims to cultivate comprehensive designers, technicians, and researchers who will act based upon steadfast ethics and creativity to face these issues and situations with highly specialized knowledge and who will have a comprehensive view of the urban environment from the dual aspects of technology and design.

This course is composed of the four areas of Urban Planning and Design, Urban Infrastructure Engineering, Urban Environmental Engineering, and Urban Information Engineering, which mutually intertwine to create the comprehensive discipline of Urban Environment Systems.

Social Needs

Graduates of this course of study go on to work as high-level specialists and comprehensive designers or planners in urban/residential government offices, public corporations, developers, construction companies, design offices, consultants who are involved with urban development, environmental corporations dealing with industrial waste and energy, electronics manufacturers, computer companies, and communications companies.

Characteristics of the Academic Program

The backbone of the Urban Environment Systems curriculum is comprised of the following three points: 1) While establishing the academic discipline of "Urban Environment Systems" as a discipline that undertakes the various issues of urban environments from the perspective of engineering, the curriculum is part of an integrated academic system that continues from the undergraduate program to the latter portion of the Doctoral program. 2) In order to fully establish a new field of study, the program must be both specialized and interdisciplinary. To this end, the curriculum aims to further specialized knowledge with core subjects for the course of study in Urban Environment Systems for the main themes in the academic research field, while also simultaneously offering subjects that cross over into other fields and address composite themes in order to cultivate a comprehensive perspective. 3) Encouraging adult education, the curriculum is set up to offer courses both during the day and at night.

• Characteristics of the first portion of the Doctoral program

1. Emphasizes the 6-year program from undergraduate to the first portion of the Doctoral program (Master's)

Given the strong trend for students to seek employment with corporations, the government, and as consultants after completing the first portion of the Doctoral program, the department emphasizes the integrity of the 6-year academic program. For adult students transferring into the program from the third year, the curriculum will be tailored with an eye to meeting the need for a 4-year academic program that includes the first portion of the Doctoral program.

2. Practices interdisciplinary and comprehensive education

While furthering specialized knowledge with core subjects for the main themes in the academic research field, the program simultaneously offers a highly interdisciplinary education through composite subjects taught by multiple faculty members in collaboration to cultivate students with a comprehensive perspective.

3. Research program on social issues

Themes that are of high social interest (declining birthrate and aging population, disaster prevention and safety, conserving resources, etc.) are provided, and multiple faculty members give lectures from the perspective of their specialty, followed by programs designed to further research.

• Characteristics of the latter portion of the Doctoral program

This portion of the program is centered on students who have continued on from the first portion of the Doctoral program, students who have continued on from other universities, and adult students, with a focus on cultivating students with a well-balanced ability to conduct advanced research and execute plans as well as comprehensive knowledge. More specifically, students are expected to acquire comprehensive and advanced knowledge in one of the four areas of Urban Planning and Design, Urban Infrastructure Engineering, Urban Environmental Engineering, and Urban Information Engineering in addition to their own specialized research.

1.2 Division of Design Science

Educational Philosophy of the Division of Design Science

> Design Science is an academic discipline with practical applications which enriches the people's lives and cultures, creating new social value. This division aims to cultivate highly specialized designers, pioneering design technicians, and design researchers who will take on the role of leaders, combining the latest information in the field of design science with the long and rich history and performance that Chiba University has in the field of design education and research.

<Overview of the Course of Study in Design Science>

The course of study in Design Science is composed of the three academic research areas: Production Systems,

Information Communications, and Environmental Humanomics. In the first portion of the Doctoral program, the program will build on the foundations laid in the undergraduate Department of Design in the Faculty of Engineering, while the latter portion of the Doctoral program will build on the foundations of design education laid in the first portion of the Doctoral program, adding a higher degree of specialization while also conducting academic research to promote an understanding of a wide array of design areas.

The program is also strongly promoting The Attractive Graduate School Educational Initiative, The Program to Support Graduate School Educational Reform, The Program to Promote the Internationalization of University Education, and The Program to Support Modern Educational Needs, chosen by the Ministry of Education, Culture, Sports, Science and Technology as "Unique Educational Research". It is also strongly promoting the "Asia Human Resource Fund Concept/Initiative to Develop Highly Specialized Foreign Students" from the Ministry of Economy, Trade and Industry and the Ministry of Education, Culture, Sports, Science and Technology, aiming to cultivate highly specialized designers, pioneering design technicians, and design researchers capable of flexibly responding to a variety of high-level demands.

Further, the program has established a curriculum that is closely tied to major overseas design universities, major domestic and overseas corporations, and other design areas within Chiba University (Architecture, Urban Environment, Horticulture) to conduct cutting edge academic research on design.

Social Needs

Design is a necessary part of a variety of areas within modern society. Graduates of this course of study are expected to go on to successful careers as highly specialized designers in the manufacturing and information industries, including automobiles, precision instruments, home electronics, and furniture; as pioneering design technicians responsible for planning and development; and as design researchers at universities and experimental research institutions.

Characteristics of the Academic Program

In both the first portion and latter portion of the Doctoral Program, this course of study includes four programs aimed at allowing students to acquire a high level of specialization through the study of subjects relating to the fundamentals of design and the applications thereof: the Research Program, Original Work Program, Applied Research Program, and Double Domain Program. Multiple faculty members work together to aim for abundantly creative academic research by providing lectures and exercises on product design, design management, materials planning, communication design, human information science, design psychology, environmental design, human lifestyle engineering, and cultural design planning.

The program also offers such programs as The Overseas Alliance Program, Collaborative Design Project Work between Industry and Academia, and The Design Internship Program, which offers various sites for interaction and exchange based on ties with major overseas design universities and major domestic and foreign corporations. In addition, the program also offers Eco-Design Theory, Care Design Theory through the "Differing Design Area Acquisition Program and through ties with Horticulture, as well as Ethics for Technicians, Venture Business Theory, and Venture Business Management as part of the common Engineering curriculum.

• Characteristics of the first portion of the Doctoral program

In order to gain an understanding of design areas in a broad sense, students are required to take Design Interactive 1, 2, and 3 in their first year. The program also offers the core subjects of Human Lifestyle Environment Theory, Materials Planning Theory, Design Psychology, and Cultural Planning Theory as well as the applied subjects of Product Design Planning Theory, Lifestyle Environment Design Theory, and Media Design Theory aiming for the acquisition of a high level of specialization in the field of design science.

• Characteristics of the latter portion of the Doctoral program

Students are required to take Design Innovations in their first year, and to further acquire a higher level of specialization, students also take the specialized subjects of Environmental Ergonomics, Artificial Sensibility, Lifestyle Design Psychology, Design Culture Theory, Media Design Theory, Behavioral Environment Design Theory, and Industrial Design Theory. The goal is for students to acquire the ability to discover uncharted territory in design science through varied, high-level academic research on design.

Although course requirements differ according to which of the four programs is chosen, both portions of the program have a Master's/Doctoral candidate evaluation at the end of the first year to determine whether the student will continue on in the program, thereby further increasing the quality of the program.

1.3 Division of Artificial Systems Science

Educational Philosophy of the Division of Artificial Systems Science

In addition to utilizing the differing areas of the academic specialties of Mechanical Engineering, Electrical and Electronic Engineering, and Medical System Engineering, the Division considers the current state of new specialized fields that combine these areas and were created through the significant academic and technological advances of recent years, conducting broad and high-level education and research through the following three courses of study:

- Mechanical Engineering
- Electrical and Electronic Engineering
- Medical System Engineering

<Overview of the Course of Study in Mechanical Engineering>

The course of study in Mechanical Engineering is comprised of the four academic research areas: 1. Materials / Strength / Deformation, 2. Processing / Elements, 3. Systems / Control / Bioengineering, 4. Environment / Energy Related Thermofluid Engineering. The educational goal of the program is to cultivate the ability to autonomously determine the questions to be researched and the ability to identify a solution. In order to correctly determine the questions to be researched, students must have a broad base of knowledge in related areas as well as a depth of insight. At the same time, students must have the ability to predict what the obstacles will be in pursuing their research, what methodologies to use to overcome them, and what effects overcoming them will have on society. It is only when these abilities are fully mastered that students will truly be able to correctly determine the questions to be researched. With the goal of cultivating these abilities, the program aims to send autonomous researchers and specialists out into society as high-level professionals.

Social Needs

Students are expected to make use of specialized mechanical engineering technologies for production, in order to have successful careers in a wide range of fields as highly specialized technicians dealing with automobiles, transport machinery such as railroads, information equipment, electric/gas/chemical plant facilities, precision instruments, or medical equipment, as well as working at government research institutions or as civil servants.

Characteristics of the Academic Program

We offer the following four research areas with the view of offering a systematic academic program that is broad yet ultimately leads to the latter portion of the Graduate School Doctoral program, allowing students to master the basic

knowledge that serves as the foundation of mechanical engineering as well as their areas of specialization:

1. Materials/strength/deformation for the components that compose machines
2 .Production technology, tribology theory, and micro-processing systems/elements
3. Systems control for transport machinery and production systems, equipment design that imitates the characteristics and mechanisms of organisms and life forms
4. Environment / energy related thermofluid engineering for maximum efficiency with minimal energy

Special exercises and special research are conducted throughout the program to cultivate the ability to identify and resolve issues. Throughout the first and latter portion of the educational program, students will master the basic knowledge that serves as the foundation of mechanical engineering as well as their areas of specialization. The program seeks to cultivate people with the ability to promote wide-ranging and high-level research and development as well as practical applications.

• Characteristics of the first portion of the Doctoral program

Upon mastering the fundamentals of mechanical engineering as well as the related disciplines of electrical and electronic engineering and bioengineering through undergraduate coursework, students in the first portion of the Doctoral program (Master's) will learn about further specialized subjects related to the production of things, becoming people capable of succeeding broadly within society.

• Characteristics of the latter portion of the Doctoral program

Centered on students continuing on from the first portion of the Doctoral program in Mechanical Engineering(Master's) as well as students transferring in from both within the university and from other universities, the program will cultivate people with a high level of specialized knowledge, problem-solving abilities, and ability to execute, with the aim of cultivating people capable of undertaking cutting edge research and development based on mechanical engineering.

<Overview of the Course of Study in Electrical and Electronic Engineering>

With a disciplinary focus on electrical and electronic engineering, the program aims to cultivate people capable of understanding the fundamental academic areas related to waves, circuits, material properties, devices, systems, control, information, and communications and applying these in a variety of electrical and electronic engineering fields. In addition, the goal of the program is to have students understand the effect that technology has on society and nature, acquiring the ability to recognize their responsibilities as highly specialized technicians in the field of electrical and electronic engineering.

Social Needs

Students are expected to make use of the specialized technologies of electrical and electronic engineering to have successful careers in a wide range of jobs related to electronic equipment, communications, electricity/gas, or precision instruments, as well as at government research institutions or as civil servants.

Characteristics of the Academic Program

The program offers the opportunity to broadly master specialized fields related to waves, circuits, material properties, devices, systems, control, information, and communications in addition to the fundamentals of electrical and electronic engineering. Ultimately, the academic program also takes into consideration the 5-year integrated program that includes the latter portion of the Graduate School Doctoral program. In addition, special exercises and special research are conducted throughout the program, providing learning and educational opportunities for acquiring communication skills

and skills in written expression that are necessary for relaying information as well as the opportunity to learn calculated and realistic problem-solving methods based on theoretical and logical thought processes.

Throughout the first and latter portion of the academic program, students will acquire the basic knowledge that serves as the foundation of electrical and electronic engineering as well as knowledge in their area of specialization. The program seeks to cultivate people with the ability to promote wide-ranging and high-level research and development as well as practical applications.

• Characteristics of the first portion of the Doctoral program

Upon mastering the fundamentals of electrical and electronic engineering as well as the related disciplines of mechanical engineering and information engineering through undergraduate coursework, students in the first portion of the Doctoral program (Master's) will gain a deeper understanding of specialized subjects related to waves, circuits, material properties, devices, systems, control, information, and communications, becoming people capable of succeeding broadly within society.

・Characteristics of the latter portion of the Doctoral program

Centered on students continuing on from the first portion of the Doctoral program in Electrical and Electronic Engineering (Master's) as well as students transferring in to the program from both within the university and from other universities, the program will cultivate people with a high level of problem solving ability and the ability to apply their knowledge, as well as the ability to pursue their research in order to cultivate people who will undertake research and development based on electrical and electronic engineering.

<Overview of the Course of Study in Medical System Engineering>

This course of study is comprised of two groups: Medical Information Systems and Medical Devices and Technologies. The program deals with medical electronics engineering with the purpose of developing medical equipment that improves quality of life as well as bioengineering, medical information engineering, and diagnostic technologies through the fusion of medicine and biology with information technologies. The two groups have mutual ties and aim to realize education with broad perspectives, furthering the areas of specialization and making effective use of imaging science. The program aims to cultivate researchers and technicians with the specializations and perspectives that will allow them to contribute to the creation of medical equipment for a healthy, enriched life in an aging society with a declining birthrate. In addition, the program will educate technicians in biomedical engineering on bioethics and the cultivation of industrial innovation.

Social Needs

Employment: Making use of the specialized technologies of medical system engineering that straddles engineering and medicine, students are able to seek employment in medical equipment manufacturing with medical equipment importers and pharmaceutical companies. In addition, based on their acquisition of basic engineering skills, students are also able to seek employment with electronics, communications, and computer companies. Students are also expected to have successful careers at pharmaceutical organizations, medical equipment centers, and other public institutions that work to standardize equipment.

Characteristics of the Academic Program

In order to realize a society where citizens are able to live healthy, secure lives in an aging society with a declining birthrate, the program will educate people capable of promoting the development and practical application of new medical equipment and welfare equipment that is linked to health maintenance and enhancement, making the extension of a

healthy lifespan a reality. In the first portion of the Doctoral program, upon mastering the fundamentals of mechanical engineering, electrical and electronic engineering, and information engineering in the undergraduate program, students will learn to understand anatomical and biological functions, and will receive education on the development of equipment with clinical uses through the collaboration between medicine and engineering. In the latter portion of the Doctoral program, centered on students continuing on from the first portion of the Doctoral program (Master's) as well as students transferring in to the program from both within the university and from other universities, the program will cultivate people with a high level of problem solving ability, the ability to apply their knowledge, and the ability to pursue their research, as well as the ability to undertake the development of diagnostic equipment and equipment used in treatment, a field which is lagging behind the US and Europe.

Against the backdrop of an aging society with a declining birthrate unparalleled throughout the world, the program seeks to educate people capable of realizing the "extension of a healthy lifespan" by promoting the development and practical application of new medical equipment and welfare equipment that is linked to health maintenance and enhancement as well as the realization of tailor-made medicine, preventive medicine, and regenerative medicine, making a society where citizens can live healthy and secure lives a reality by organizing databases on diseases and developing advanced medical equipment by applying cutting edge technologies.

In conjunction, the program will also educate students on safety, legal, social, and ethical issues.

• Characteristics of the first portion of the Doctoral program

Upon mastering the any fundamentals of mechanical engineering, electrical and electronic engineering, or information engineering in the undergraduate program, students will learn to understand anatomical and biological functions, receiving education on the development of equipment with clinical uses through the collaboration between medicine and engineering.

• Characteristics of the latter portion of the Doctoral program

Centered on students continuing on from the first portion of the Doctoral program (Master's) in Medical System Engineering as well as students transferring in to the program from both within the university and from other universities, the program will cultivate people with a high level of problem solving ability, the ability to apply their knowledge, and the ability to pursue their research, as well as the ability to undertake the development of diagnostic equipment and equipment used in treatment, a field which is lagging behind the US and Europe.

1.4 Division of Applied Chemistry and Biotechnology

Educational Philosophy of the Division of Applied Chemistry and Biotechnology

The development of science and technology is backed by the development of new materials and their use in various fields. This division systematically educates students on the basic principles of materials and chemical processes, how this relates to function, and their application as substances in order to create these types of materials and their high functionalities. In the first portion of the Doctoral program, students are educated on the basics and applications of materials and substances with high functionality, cultivating people with a desire to develop new materials and new chemical processes. In addition, students are educated on the formation of a scientific ethical perspective and giving back to society through research results. The latter portion of the Doctoral program cultivates researchers with exceptional problem-solving skills and broad perspectives who have flexible concepts and ideas based on a deep understanding of materials and chemical processes.

<Overview of the Course of Study in Applied Chemistry and Biotechnology>

In order to realize a sustainable society in the 21st Century, it is crucial to develop chemical processes that are environmentally friendly and to create materials that are suited to the environment. Further, in order for people to live in harmony with the earth, it is essential that the functions of living things be identified from a chemical perspective, and that materials or chemical processes be developed using or imitating these functions. This course of study is comprised of four academic research areas, "Bio-Functional Chemistry", "Sustainable Organic Chemistry", "Inorganic and Analytical Chemistry", and "Chemistry for Efficient Conversion of Natural Resources". The goal of this program is to bring out the ability to create new materials, ingredients, and processes through new concepts and methods, promoting the essential understanding of materials and chemistry. The program aims to cultivate researchers and engineers with broad perspectives developed through the mutual cooperation between areas, while also furthering their specialized knowledge within the respective areas.

Social Needs

The academic context for this course of study is chemistry, with the "environment" and "bio" as the targets for application. As a result, graduates are employed in a variety of manufacturing industries related to materials, such as the chemical industry, automobile industry, energy industry, electrical industry, and food industry, as well as national or public research institutes.

Characteristics of the Academic Program

The course of study in Applied Chemistry and Biotechnology systematically educates students on the structure and physical properties of materials, how this relates to function, and their application as substances in order to create exceptional materials with high functionalities. In addition to coursework, advanced seminar and graduate research is conducted throughout the program, allowing
students to acquire the skills of identifying solutions to issues and methods for solving these issues. Through this academic program, students are also able to acquire the ability to logically summarize these results and report them.

This course of study is comprised of academic programs that cultivate people capable of resolving various issues pertaining to the "environment" and "bio". Using the four fundamental disciplines in chemistry of organic chemistry, inorganic chemistry, analytical chemistry, and physical chemistry as tools, the program cultivates researchers and engineers who have acquired the ability to resolve issues through cutting-edge research. To this end, subjects with a systematic approach to chemistry have been allocated to the first year of the first portion of the Doctoral program, while subjects where students learn the research methods necessary for application have been allocated to the second year. In the latter portion of the Doctoral program, it is possible for students to take these subjects given in the first portion of the Doctoral program as necessary, and, in addition, the program cultivates independent researchers capable of identifying the essence of complex issues and resolving them.

• Characteristics of the first portion of the Doctoral program

In the first portion of the Doctoral program (Master's), in addition to further furthering the fundamental and systematic knowledge and ways of thinking about organic chemistry, inorganic chemistry, analytical chemistry, and physical chemistry acquired in the undergraduate program, courses are offered to cultivate the ability to specifically apply and resolve social issues. In addition, the program also offers a course titled "Advanced Seminar in Intellectual Property Rights" intended to cultivate the knowledge necessary to soundly give back the results of their research to society.

• Characteristics of the latter portion of the Doctoral program

In addition to students continuing on from the first portion of the Doctoral program, the program also welcomes students from outside the university, such as adult students. This course of study provides education with the aim of cultivating independent researchers and engineers with a high level of ability to pursue their research. In addition to furthering their specialized knowledge in the academic research area they are affiliated with, students have the opportunity to acquire broad perspectives through ties and collaboration with other areas.

2. Academic Research Areas and Descriptions

Note: △denotes faculty who will retire on March 31st, 2015 .
○denotes faculty who will retire on March 31st, 2014.
◎denotes faculty who will retire on March 31st, 2013 .

Division of Architecture and Urban Science | Department of Architecture

Academic Research Area: Architectural and Environmental Planning

Professor Akira Kuryu ◎: Urban architecture, underground architecture, landscapes, collaboration

Professor Yuichi Fukukawa △: Conservation of historic environments, revitalization of central urban areas, urban planning systems theory, approaches to urban design

Professor Shigeki Nakayama: Architectural planning, facilities design planning, facilities management, POE, public facilities planning, hospitals, welfare facilities

Professor Martin Morris: History of architecture, urban history, history of artificial environments, conservation and restoration of historic architecture, architectural design based on historical learning

Professor Kaname Yanagisawa: Facility programming, environment behavior design studies, educational facility planning

Associate Professor Shinsuke Kaneyuki: History of urban spaces and landscapes, housing history, history of temple and shrine architecture, study of urban plans and maps, theories of urban conservation and renewal

Associate Professor Satoshi Okada: Architectural design, theory of contemporary architecture, theory of modern architecture, sociology of architecture

Associate Professor Akiko Okabe: Urban environment, sustainable development, integrative policies, spatial planning, shrinking cities

Associate Professor Sumiko Ebara: Historic building, conservation, preservation, modern architecture, history of architecture

Associate Professor Hiroki Suzuki: Architectural design, landscape design, landscape evaluation

Assistant Professor Yohsuke Yoshioka: Architectural planning, visual environment, spatial recognition, ergonomics, productivity

Description: The basic premise of this area of research is to study approaches to design from the fundamental planning technologies that plan and design architecture and cities from the perspective of creating, forming, and maintaining residential spaces, which are the basic site of human activity, while also considering these from a historical perspective. Approaches to modern architectural design are investigated, and planning technologies that correspond to the relevant conditions, the significance of design in architectural processes, approaches for deploying design, and social systems such as consensus-building and systems are considered from a historical perspective for the respective regions and times.

Academic Research Area: Building Science and Building Production

Professor Takaharu Kawase: Environmental facility planning and design, energy-efficient planning, workplace productivity, application of solar power generation system

Professor Masao Ando ○: Structural and construction systems planning, building production design, project management, property management

Associate Professor Jun Munakata: Environmental engineering, visual environment, environmental psychology

Associate Professor Gakuhito Hirasawa: Architecture, building structural systems, building production, 3DCG, architectural model database, mixed reality

Visiting Associate Professor Seiji Kobata: Architectural planning, redevelopment, revitalization of urban areas

Description: The basic premise of this area of research is to focus on both the interior and exterior environment of architectural structures; predicting, evaluating, and applying their physical aspects; and evaluating and managing environmental optimization technologies and the structural systems technologies that form them.

Research and education will center on behavioral psychology approaches for evaluating the quality of spaces, ensuring building and residence performance capable of contributing both to comfort and a sustainable society, the planning, design, and production technologies for various architectural structures and facilities, the development of sustainable construction management and structural systems, and the technologies that aim to reduce environmental impact and energy use.

Academic Research Area: Structural Design

Professor Toru Takahashi: Building construction, design load, long-period seismic waves, statistics of extremes, structural reliability, target standards, performance based design

Professor Yukihiro Harada: Study of building construction, steel structures, quake-resistant design of architectural structures

Professor Nobuyuki Izumi: Building construction, reinforced concrete structures, quake-resistant design, damping structures, architectural structure design

Associate Professor Koichi Maeda: Building materials, concrete materials, durability, fireproof and fire-resistant capabilities, architectural mathematics

Associate Professor Takeo Hirashima: Building construction, fires, fire-resistance, thermal stress analysis

Associate Professor Yukiko Nakamura: Structural engineering for buildings, earthquake engineering, reinforced concrete structures, masonry

Assistant Professor Takashi Kashiwazaki: Reinforced concrete structure, prestressed concrete structure, beam-column joint, seismic design, seismic performance

Assistant Professor Tomofusa Akita: Reinforced concrete building construction, quake-resistant walls, load-bearing limit calculations, seismic response evaluations, interactions between buildings and land

Assistant Professor Yuko Shimada: Study of building construction, steel structures, earthquake-resistant design of buildings structures

Description: The basic issues covered by this area of research are the development of response evaluations and rational structural formats for structures using reinforced concrete and steel, as well as establishing methods for evaluating their performance; understanding the qualities of the various external disturbances that threaten the safety of structures; from natural disasters such as earthquakes, wind, and snow to other disasters such as fires; and establishing fundamental theories for designing structures and methods of evaluating them. It also considers the characteristics of the basic materials that comprise architectural structures and evaluates their performance. This area of research also aims to discover new materials for the formation of a sustainable society, developing structural systems using these new materials and establishing methods of evaluating them.

Division of Architecture and Urban Science Department of Urban Environment Systems

Academic Research Area: Urban Planning and Design

Professor Toshio Kitahara ◎: City planning, urban design, urban landscape planning, urban revitalization planning, community building, community planning

Professor Hideki Kobayashi: Housing and residential environment planning, community design, housing policies, community building, real estate systems, architectural planning

Professor Kiharu Tsuge: Producing urban environments, redevelopment of urban areas, mixed use facilities design

Associate Professor Miki Muraki: City planning, area management, PPP, revitalization of central urban areas, sustainability

Associate Professor Ryohei Morinaga: Architectural planning, urban residential planning, community design, planning with citizen participation, housing and community building

Associate Professor Masaru Miyawaki: Urban design, city planning, landscape design, urban regeneration, cultural assets, color

Lecturer Atsushi Maruyama ◎: History of architecture, history of urban planning, restoration and conservation of historic districts, utilization of cultural assets, retrospective therapy, modern and contemporary German architecture

Assistant Professor Dongyun Kwak: Urban planning, urban design, urban landscapes in Japan and Korea, urban revitalization planning, community building, community planning

Assistant Professor JiYoung Jung: Sustainable community design, living and environmental design and planning, residence development of unrelated new family, new housing planning of resident participation

Description: This research area undertakes specialized academic research on the planning and design of urban landscapes, cityscapes, public spaces, commercial spaces, urban architecture, and communities suitable for modern society. Academic research is conducted under the themes of building cities that can be sustainably maintained and created, building cities that coexist with nature, building cities that continue and develop traditional culture and heritage, and building cities that are vital and supported by industry. In order to respond to the issues of the times, this research area investigates the specific forms and expressions of urban residences that are good for the environment, urban restoration, and regional restoration.

Academic Research Area: Urban Infrastructure Engineering

Professor Shoichi Nakai: Earthquake disaster prevention, quake-resistant design, foundational vibrations, fundamental structures, dynamic interactions, microtopography, traffic vibration

Professor Fumio Yamazaki: Urban infrastructure, earthquake disaster prevention, lifeline systems, remote sensing, transportation systems, geographic information systems

Associate Professor Yoshihisa Maruyama: Urban disaster prevention, real-time earthquake engineering, numerical simulation of tsunami propagation, post-disaster traffic simulation

Associate Professor Goro Kondo: Concrete engineering, construction materials, reinforced concrete structures, seismic design of concrete structures

Assistant Professor Toru Sekiguchi: Geotechnical earthquake engineering, microtremors, seismic ground motion, foundation engineering, seismic disaster mitigation

Description: Modern cities must aim to ensure safety, security, and sustainable development that is replete with order and vitality in the area of urban infrastructure systems and buildings. This academic research area undertakes specialized research from the perspective of regional collaboration and international development on urban disaster prevention, urban infrastructure, and structures and construction materials. Various themes are investigated related to safety engineering for lifelines and transportation infrastructures, urban disaster prevention technologies for soils and foundations, and structures and construction material technologies.

Academic Research Area: Urban Environmental Engineering

Professor Hironao Ogura: Effective energy utilization systems, energy savings, chemical heat storage, chemical heat pumps, environmental energy engineering, chemical engineering

Professor Hideki Nakagome: Thermal engineering, environmental and new energies, cryogenic technologies, waste and recycling, pyrolysis, hydrogen, magnetic refrigeration

Professor Yasufumi Otsubo △: Environmental particle technology, soft machines, fluid devices, colloids, rheology control

Associate Professor Kenkichi Sato: Socio-mechanical engineering, history of technology, wind power generation, method of caustics, eco-ethica（eco-ethics for technological society）

Assistant Professor Yuji Hirose: Multicomponent polymer systems, polymer dynamics, colloidal dispersion of particles, fluid devices, rheology control

Description: The purpose of the academic research conducted in the research area of Urban Environmental Engineering is to investigate and to put into practice the methodologies for the creation and maintenance of urban environments that serve as the foundation of comfortable and sustainable cities from the perspective of environmental engineering. In particular, this research area undertakes the latest specialized academic research that can be put into practice from the perspective of the resources recycling, energy systems, environmental energy preservation, and environmental management. These are based on the knowledge of chemical engineering and mechanical engineering required to form energy efficient urban environments, conserve resources, and reduce environmental impacts.

Academic Research Area: Urban Information Engineering

Professor Yasuo Sugai: Systems engineering, analysis and design of large-scale networks, optimization engineering, neural networks

Professor Shigeo Shioda: Communication networks, Internet, operations research, performance evaluations, probability theory

Associate Professor Sachiyo Arai: Artificial intelligence, machine learning, decision theory, game theory, internet community, transportation networks

Associate Professor Hiroyuki Yoshimura: Optical engineering, optical information processing systems, information security, cryptography, signal and image processing, biometrics, electromagnetic wave engineering

Associate Professor Yasuhiko Higaki: Information systems, applications of Web infrastructures, system architecture, approaches to software development0

Assistant Professor Kazuo Yamamoto ◎: Communications systems, digital signal processing, image restoration, component analysis

Description: Information is one of the major components of cities. In modern cities, it is crucial that we communicate information freely and mutually beyond the restrictions of time and distance, and that we analyze the obtained information by use of mathematics and information science. This research area undertakes specialized and practical academic research related to urban areas, such as efficient information search technologies, improvment of the amenity and reliability of the information communication infrastructure, and modeling and simulation technologies to describe and estimate the environment. These are based on the achievements in the core academic fields related to information, such as information science, communication engineering, and mathematical analysis.

Division of Design Science | Department of Design Science

Academic Research Area: Production Systems

Professor Hiroyuki Aoki ◎: Materials planning, industrial design, *Kansei* (emotion) engineering

Professor Makoto Watanabe: Industrial design, design systems, design management, design planning

Professor Mitsunori Kubo: Design morphology, modeling dynamics, production design, materials planning

Professor Fumio Terauchi: Materials planning, design psychology, *Kansei* (emotion) engineering, touch, smell

Visiting Professor Shyuichi Misono: Transportation design, design management, production design

Visiting Professor Koichi Hayashi: Transportation design, design management, production design

Visiting Professor Shinji Watanabe: Industrial design, design management, in-house design, design strategy

Associate Professor Edilson S. Ueda: Sustainable design, eco-product design, eco-service design, design of sustainable products and services, ecological design

Associate Professor Kenta Ono: Industrial design, systems design, design management, interface design

Assistant Professor Yusuke Ashizawa: Design management, service design, design promotion, design thinking methodology, system design

Assistant Professor Takatoshi Tauchi: Design modeling, fundamentals of modeling, modeling analysis, public art, sculpture

Assistant Professor Yasuhiro Ohara: Visual communication design, information architecture, computer graphics, advertising, history of design

Assistant Professor Ayako Nagase: Urban environmental design, urban greening technology, urban ecology

Description: In order to produce products that are useful for human life, various social requirements and the needs of people must be considered comprehensively. This research area studies the various conditions that are necessary when producing a product as a sequentially connected system. More specifically, academic research is conducted on the theories, methods, and applications of product design, design management research that evaluates and plans design from a systems perspective, and research on materials planning where design is considered from the perspective of materials.

Academic Research Area: Information Communications

Professor Haruo Hibino: Design psychology, color psychology, impression evaluations, psychophysics, emotional design

Professor Koichi Iwanaga: Human information science, techno adaptability, human interfaces, techno stress

Associate Professor Keita Ishibashi: Bio-information analysis, physiological anthropology, chronobiology

Associate Professor Youichi Tamagaki: Digital information expression, color information, computer graphics, visual communication design

Associate Professor Yoshie Kiritani: Communications design, psychology for designers, psychology of perception

Associate Professor Shinichi Koyama: Perception, cognitive psychology, design psychology, neuropsychology, neuroscience

Description: Information and how it is given and received, or information communications, is an important issue that is closely tied to all aspects of human life. This research area is characterized by a multi-faceted inquiry into these issues from the perspective of design. More specifically, academic research is conducted on communication design, which deals with the issues of the planning and evaluation of information communications media; human information science, which deals with the issues of the planning and evaluation of human interfaces; and design psychology, which deals with the issues of design from the perspective of psychology.

Academic Research Area: Environmental Humanomics

Professor Tetsuo Katsuura △: Human life engineering, environmental ergonomics, physiological anthropology, design humanomics

Professor Naoto Suzuki ○: Regional design that responds to social change, lifestyle building, traditional technologies, poverty and globalization

Professor Akira Ueda: Design culture planning, utilization of local resources, endogeneous regional development, endogeneous tourism creation

Professor Kiminobu Sato: Environmental design, spatial design planning, environmental psychology, sound environment planning

Visiting Professor Koichi Matsuo: Japanese folk religion, Japanese history and tradition of performance arts

Associate Professor Yoshihiro Shimomura: Design humanomics, physiological anthropology, human life engineering, Biomechanics

Associate Professor Takayuki Higuchi: Contextual design, design studies, design theory and history, Japanese design culture,

symbiotic environmental design, interior design

Associate Professor Hiromichi Hara: Environmental design, planning of walking environments, planning of play environments

Description: Living environments are composed of various elements which change according to the needs and conditions of the occupants or users. This area of research considers the relationship between people and the environment from a cultural perspective, a behavioral perspective, and from the perspective of ergonomics. Academic research is conducted on regional development and the creation of specific environmental tools, environments based on human characteristics, and the elements that compose these environments while clarifying the relationship between the environment and people at the respective levels.

Division of Artificial Systems Science | Department of Mechanical Engineering

Academic Research Area: Materials / Strength / Deformation

Professor Ning Hu: Mechanics of materials, computational mechanics, materials strength, composite materials, damage evaluation, optimization

Professor Hiroshi Asanuma: Smart materials, intellectual materials and structural systems, composite materials, multi-functional materials, self-restoration

Visiting Professor Kei Sakata: Iron & steels, automotive steels, microstructural control, material evaluation, physical, chemical analysis

Associate Professor Hideo Koyama: Plastic working, processing systems, new molding methods, sequential molding, properties of materials

Associate Professor Kenichi Kobayashi: High temperature structural design, creep constitutive equation, heat-resistant materials, remaining life estimation, simplified inelastic analysis

Associate Professor Yun Lu: New energy materials, environmental materials, evaluation of material functions, powder metallurgy, composite materials engineering

Associate Professor Takaomi Itoi: Magnesium alloys, iron aluminides, machine materials, organizational control, micro-organizations, TEM observation

Associate Professor Tomonori Watanabe: Continuum mechanics, viscoelasticity and rheology, distortion and strength of materials, nonlinear mechanics, mathematical science

Description: The purpose of the materials, strength, and deformation academic research area is the development of highly functional materials and the improvement of the properties of those materials that serve as the foundation for the materials and elements that compose machines. It also seeks to develop new methods for evaluating strength and to improve the strength properties that are dependent on the loading patterns and shape of the components, as well as to develop methods for evaluating strength in extreme environments, improve the processing properties when plasticizing the component elements, and develop new processing methods. To this end, this area covers the areas of materials engineering, functional materials, mechanics of materials, material strength, plastic engineering, and materials processing, and conducts the corresponding education and research to make creative development thereof a reality.

Academic Research Area: Processing / Elements

Professor Noboru Morita : Precision machining, non-traditional machining, micro machining, machine tool, cutting tool, surface integrity

Professor Takeshi Nakamoto: Micro-processing, machine processing, 3-D modeling, laser processing, machine elements

Professor Hiroshi Mishina: Tribology, friction and wear, lubrication, artificial joints, biomaterials

Associate Professor Hirofumi Hidai : Super-precision machining, laser machining, bioenergy

Assistant Professor Souta Matsusaka: Laser micro-processing, laser welding, micro joining, surface activating cold joining

Assistant Professor Tatsuo Ohmori: Tribology, machine elements, lubrication, rolling roller bearing, lifespan of roller bearings

Description: The purpose of the processing systems and elements area is the building of pioneering processing systems and the substantiation of methods for processing on a more micro level. To this end, it is necessary to inspect the principles and rules that are established when processing and to understand the physical and chemical phenomena that greatly affect processing. This area conducts education and research on the physics of processing and understanding the physicality of materials and ingredients, understanding chemical phenomena, and pioneering processing systems based on the understanding of processing phenomena and the physicality of materials. In addition, auxiliary education is also provided on topics such as machine design and the structural analysis of the elements that compose machines.

Academic Research Area: Systems / Control / Bioengineering

Professor Hideo Kato ◎: Production systems, machine operations assist, virtual reality, skill training and inheritance, sensory feedback

Professor Kenzo Nonami ○: Unmanned aerial vehicles/micro aerial vehicles, six legged walking robots, dual manipulator and hand robots, autonomous robotic boats, autonomous intelligent mobile robots, flywheel energy storage system and electric vehicles, systems control

Professor Hao Liu: Biodynamics, computational dynamics, biological flight and notation, winged flight vehicles, biomimetics, physiological flow, circulatory system simulations, multi-scale/multi-physics modeling, medical imaging

Associate Professor Shizuichi Higuchi ◎: Intelligent production systems, grinding and polishing technologies, image processing, assessments of surface texture

Associate Professor Akio Namiki: Robotics, high-speed vision, multifingered hand, high-speed manipulation and grasping, mechatronics, control engineering

Associate Professor Ken-ichi Tsubota: Computational mechanics, biomechanics, bone remodeling, microcirculation, cell simulations, functional adaptation

Associate Professor Mihoko Otake: Cognitive activity support system, conversation support robots, functional polymer sensors and actuators, bioinstrumentation, human behavior measure, human modeling, service creation, artificial intelligence, healthcare, medical and welfare engineering, data science

Project Associate Professor Michiko Sugawara: Biomechanics, computational systems biology, cell movements, multi-scale and/or multi-physics modeling of cell dynamics

Visiting Associate Professor Koji Tanita: Systems control

Assistant Professor Kazuya Okawa: Intelligent mechanical systems, robotics, learning control, behavioral intelligence, group intelligence

Assistant Professor Daigo Fujiwara: Unmanned aerial vehicles (UAV), flight control, mechatronics, aerodynamics, control engineering

Description: The purpose of the systems control and bioengineering area is the realization of the engineering applications of life function mechanisms and the optimal movements of living organisms as well as the realization of intelligent and autonomous mechanical systems such as robots and mechatronics, vehicles, flight vehicles, dynamical systems, and welfare support equipment. In doing so, the human load on those operating the machinery can be reduced and the operating efficiency can be increased. To this end, education and research will be conducted on dynamic systems, control engineering, bioengineering, and behavioral studies.

Academic Research Area: Environment / Energy Related Thermofluid Engineering

Professor Masahiro Takei: Multiphase flow, visualization, two phase flow, micro channel, artificial heart, plant

Professor Kazuo Maeno △: Aerospace thermal flow, applied laser measurement, shock waves, compressible fluids, extremely low temperatures

Professor Yasuo Moriyoshi: Thermofluid engineering, internal combustion engine, modeling, numerical analysis, laser measurement diagnostics

Visiting Professor Toshio Yamada: Internal combustion engine, combustion, HCCI engine, simulation, ignition, modeling

Associate Professor Gaku Tanaka: Energy storage and transport machines, medical and biological thermal engineering, bio-fluidics

Associate Professor Fumihiko Mikami: Fluid engineering, visualization and particle image velocimetry, micro flows, complex fluids, projectiles

Assistant Professor Masanori Ota: Thermo-fluid dynamics, laser processing, energy engineering, heat transfer engineering, shock waves

Description: The purpose of the Environment/Thermal Body Energy area is the realization of the optimization and diversification of energy sources that are indispensable for the maintenance of enriched, comfortable lifestyles without having a negative impact on the environment. To this end, education and research is conducted on thermal engineering and fluidics related to energy supplies, recycling, use, and conversion.

Division of Artificial Systems Science | Department of Electrical and Electronic Engineering

Academic Research Area: Waves / Circuits

Professor Kenichiro Yashiro: Microwave engineering, synthesis of nonuniform transmission lines, inverse scattering, filters, scattering of electromagnetic waves, numerical analysis

Professor Toshiaki Takano: Radio wave science, measurement and application of electromagnetic waves, development of measurement systems, weak radio wave reception, highly sensitive milli-wave radar

Associate Professor Hideo Saotome: Magnetic applications, magnetic actuators, ferrite, power electronics, AC/DC converters

Assistant Professor: Hiroyuki Nakata: Aeronomy, space physics, plasma physics, radio wave propagation, magnetosphere, ionosphere, aurorae, MHD waves

Description: This research area conducts academic research on the electromagnetic phenomena and wave phenomena that accompany the various physical phenomena in space, the atmosphere, and the earth, studying methods for designing microwave filters through inverse dispersion approaches, analyzing the propagation and dispersion of electromagnetic waves in periodic structures, and studying electromagnetic applied engineering and the area of power electronics. Research is also conducted on high-performance high-frequency ultrasound devices for mobile communications and high-performance ultrasound devices, sensors, and actuators based on thin film micro-processing technologies.

Academic Research Area: Materials / Devices

Professor Kazuhiro Kudo: Organic semiconductors, organic transistors, ultra-thin-film materials, semiconductor devices, molecular devices

Professor Yoshihiro Ishitani: Semiconductor optical physics, semiconductor optical devices, semiconductor nanostructures, nitride semiconductors

Visiting Professor Shinji Okamoto: Electronic display, inorganic EL, luminescent material, fluorescent material, optical

condensed matter physics

Visiting Professor Naoki Shimizu: High-density and large-capacity information storage, hologram, optical modulator, spin-transfer magnetization reversal, magneto-optical effect

Associate Professor Masatoshi Sakai: Organic electronics, organic semiconductor, Mott insulator, selective and oriented growth of organic crystals, molecular nanodevices, flexible electronics

Assistant Professor Shigekazu Kuniyoshi △: Organic semiconductor materials, thin-film and interfacial physics, electronic devices, porous alumina, anodization

Description: This area conducts academic research on nanoscale electronic materials and devices using organic semiconductors such as nanoscale transistors, thin film transistors, and flexible sheet displays. High-performance optoelectronic materials and devices such as blue light-emitting diodes and lasers, flat surface displays, and optical sensors are studied from crystal growth to material characterization through making prototypes and theoretical analysis of devices.

Academic Research Area: Systems / Control

Professor Yukihiko Sato: Power electronics, electronic equipment, motor control, electrical system control, new energies

Professor Hironori Hirata ○: Systems science and engineering, large-scale systems, biological systems, optimization, intelligence and learning

Professor Kang Zhi Liu: Systems control engineering, advanced control theory, control of power electronics, control of power systems, smart-grid

Professor Seiichi Koakutsu: Computational engineering, VLSI layout CAD, probabilistic optimization, evolution and learning systems

Visiting Professor Kazuo Watanabe: Extra-high voltage transmission system, electric power cable, electric material, high electric field phenomenon, application of elliptic function

Associate Professor Keiichiro Kondo: Motor control, power electronics, electric machinery, energies storage, and their applications to the railway traction

Associate Professor Tadanao Zanma: System control, hybrid control, robots, mechatronics control

Assistant Professor Takashi Okamoto: Optimization methods, game theory, multi-objective optimization, application of nonlinear dynamics to engineering

Assistant Professor Kenji Natori: Energy network, energy storage system, new energy, control engineering, motion control

Research Associate Hiroyo Ohya: D-/E- region ionosphere, tweek atmospherics, magnetic storms, solar cycle variations, solar eclipse effects

Description: In this research area, academic research is conducted to realize the effective and advanced use of electrical energy through applied technologies, control, and current modes for semiconductor power converters. Research is also conducted on the analysis, design, and modeling of large-scale complex systems; the engineering applications of biological systems; ecological systems; and the structural theory of systems and the feedback control theory thereof.

Academic Research Area: Information / Communications

Professor Kenya Hashimoto: Ultrasonic engineering, elastic surface wave devices, high-frequency electronic circuits, communications engineering, micro-processing, optical probes, sensors

Professor Tomoyoshi Ito: Computational science, exclusive computers, hardware, numerical computations, electronic holography, 3-D moving images

Professor Heitoh Zen (General Media): Image and video processing, computer vision, multimedia, sensing

Professor Hideo Takahashi (Linguistic Education): Educational engineering, CALL system, information equipment, multimedia, communication, English education

Visiting Professor Shin-ichi Shikada: Diamond films and single crystals, power semiconductor devices, electron emission source, communication devices, and sensors

Associate Professor Chang-Jun Ahn: Communication theory, MIMO system, RF circuit theory, software defined radio, cognitive radio

Associate Professor Tomoyoshi Shimobaba: Computer synthetic holograms, 3-D displays, digital holography microscope, FPGA, embedded equipment

Assistant Professor Tatsuya Ohmori: Elastic wave device, electronic circuits, high frequency circuits, optical fiber sensor, wireless sensor

Assistant Professor Takashi Kakue: Holography, Digital holography, High-speed imaging, 3D imaging and measurement, Recording, observation, and Visualization of ultrafast phenomena

Description: This area conducts academic research on computer resources and network environments, which are becoming increasingly high-speed and high-volume. Theoretical and empirical research is conducted from both hardware and software aspects on communications systems such as mobile communications, next-generation network systems that make the transmission of large-scale image media information possible, computational systems that realize high-speed numerical simulations, language education systems based on the quantitative analysis of natural language, and biological information measurement systems that optically identify brain function information.

Division of Artificial Systems Science | Department of Medical System Engineering

Academic Research Area: Medical Information Systems

Professor Etsuji Yamamoto: Image measurement system, MR imaging, ultrasonic imaging, image simulator

Professor Tatsuo Igarashi: Endoscopic image processing, endoscopic surgery, surgical equipments, three-dimensional and panoramic image for endoscopy

Professor Hideaki Haneishi (Frontier Medical): Processing, analysis and integration of CT, MRI and PET images, medical application of color and spectral information

Professor Hideki Hayashi (Frontier Medical): Minimally invasive surgery, near-infrared bioimaging, sentinel lymph node navigation surgery, characteristic analysis of surgical energy devices

Visiting Professor Yuichi Kimura: Molecular imaging, nuclear medicine, medical image processing, biomodeling and analysis, biological signal processing

Associate Professor Kazuhiko Onuma: Ophthalmological optics, optical measurement, medical image processing

Associate Professor Mikio Suga: Medical image engineering, bioinstrumentation engineering, MRI, PET, biological elasticity measurement

Associate Professor Tadashi Yamaguchi (Frontier Medical): Medical imaging, medical ultrasound, ultrasonic engineering

Description: This research area oversees education and research on biological signal processing, image processing, medical information, and cognitive science. With information engineering and visual engineering as the main foundations, the area has as its goals the cultivation of practical and theoretical skills in medical information systems. In addition, in light of the progressive implementation of informational devices and diagnostic imaging devices in the area of medicine, education and research are also conducted on these electronic and information trends. The discovery and development of new technologies is also conducted using information and image theory, including database processing technology that makes quantitative determinations based on statistical methods and technologies that visualize things that were not clearly observable using X-rays through precise image processing. Further, this area investigates the research and development of remote medical systems using the Internet and communications satellites and the development of virtual surgical systems using VR (Virtual Reality).

Academic Research Area: Medical Devices and Technologies

Professor Koichi Ito: Antennas, medical electromagnetic engineering, antennas for medical application, body-centric wireless communications, human body phantoms

Professor Wen-wei Yu: Biocontrol, bioengineering, medical robotics, rehabilitation robotics (including assistive technology), artificial intelligence

Visiting Professor Kenichi Komatsu: Diagnostic imaging system, diagnostic image processing, MOT for diagnostic imaging business, R&D management

Associate Professor Masakazu Iwasaka: Biomagnetism, magnetic field effects, high field magneto-science, biomagnetics,

Associate Professor Toshiya Nakaguchi: Computer aided surgery and diagnosis, virtual reality training in medicine, medical image processing, biomedical measurement

Associate Professor Kazuyuki Saito (Frontier Medical): Engineering of electromagnetic wave, medical applications of microwave, numerical simulation of electromagnetic wave

Associate Professor Masaharu Takahashi (Frontier Medical): Interaction between human body and electromagnetic wave, electromagnetic compatibility, planar array antennas, electrically small antennas, body area network

Project Associate Professor Ryoichi Nakamura: Computer aided surgery, surgical manipulator, surgical navigation, surgical workflow analysis

Assistant Professor Nobuyuki Masuda: Computational engineering, digital signal processing, LSI design, numerical computations, circuit design

Assistant Professor Kazuya Kawamura: Surgical robot, surgical robot design simulation, operability evaluation, rehabilitation assist robot, gait measurement

Description: This area oversees research and education on medical magnetics, medical electronics, systems control, and welfare engineering (including rehabilitation engineering). Theoretical and practical education and research are conducted with electronics engineering and mechanical engineering as the main foundations for basic knowledge on the development of medical equipment and welfare equipment in an aging society with a declining birthrate. In addition, research and development on new equipment that will prove useful for diagnoses and treatment is also conducted. New technologies are created for more accurate, effective, and efficient treatment, such as the development of drug delivery systems using nanotechnology, the development of minimally invasive surgical systems using micromachines that minimize the stress placed upon the body, preventive medicine that improves the quality of daily life and extends lifespans, and the development of wearable devices for health management. This area also investigates the development of medical micromachine technologies and nursing care systems using robotics.

Division of Applied Chemistry and Biotechnology　Department of Applied Chemistry and Biotechnology

Academic Research Area: Bio-Functional Chemistry

Professor Kyoichi Saito: High-speed protein purification, bioreactors, bioaffinity reaction on porous adsorbents, radiation graft polymerization, polymer brush

Professor Minoru Seki: Bioprocess engineering, chemical reaction engineering, micro/nanofluidics, microreactors, biochips, microTAS, microfabrication, bioreactors, biocatalysts, cell culture and separation

Visiting Professor Keiji Sakaki: Biochemical engineering, separation engineering, biorefinery

Associate Professor Yuji Sasanuma: Macromolecular physicochemistry, statistical dynamics, quantum chemistry, NMR, structure and property correlations, molecular design, weak interactions

Associate Professor Masahito Kushida: Molecular electronics, bioelectronics, surface science, metal nanoparticles, carbon nanotubes, near-field optics

Associate Professor Tatsuo Taniguchi: Polymer chemistry, surface chemistry, colloidal polymer particles, photofunctional polymers, latex diagnosis

Associate Professor Daisuke Umeno: Molecular evolutionary engineering, genetic mutation engineering, synthetic biology, metabolic engineering,

Project Associate Professor Masumi Yamada: Microfluidics, microfabrication, biochemical engineering, biomaterial synthesis, bioseparation

Assistant Professor Michinari Kohri: Glycotechnology, functional polymer, glycomaterial, enzymatic polymerization,

Description: Various biological functions such as enzymatic reaction, recognition, and separation are based on precise mechanisms of molecular interactions. In this research area, these molecular interactions are identified, and the correlation between functional emergence and molecular structure is investigated from both theoretical and experimental standpoints with the aim of creating materials and processes that substitute and exceed biological functions. These include: materials and reaction systems using DNA and enzymes as one of their components, new diagnostic and analytical tools using particles, creation of biodegradable macromolecular materials, photoconductive/magnetic materials with biological-like functions, and recreation of functional biomolecules using genetic engineering.

Academic Research Area: Sustainable Organic Chemistry

Professor Akihide Kitamura △: Photochemistry, optical function materials, energy conversion materials, electron transfer reactions, noninvasive measurements

Professor Shigeo Kohmoto: Supramolecular chemistry, molecular recognition, soft materials, optical function materials

Professor Masami Sakamoto: Organic synthesis, organic photochemistry, crystal engineering, asymmetric synthesis, heterocyclic chemistry, molecular recognition

Professor Takashi Karatsu: Photochemistry, organic silicone chemistry, luminescent materials, organic electro-luminescence, photochromic materials

Professor Keiki Kishikawa: Liquid crystals, soft materials, supramolecules, suprastructures, nanofunction materials

Professor Motohiro Akazome: Organic synthesis , supramolecular chemistry, functional materials, crystal engineering, molecular recognition

Associate Professor Takashi Mino: Organic synthesis, organic metal chemistry, transition metal catalysts, sustainable organic chemistry, asymmetric synthesis, nanomolecular construction

Associate Professor Shoji Matsumoto: Organic synthesis, functional materials, heteroatom chemistry, iodine chemistry, green chemistry

Associate Professor Shiki Yagai: Self-organization, self-assembly, Supramolecular chemistry, functional dyes, photochemistry, nanomaterial, biomimetics

Assistant Professor Masahiro Takahashi: π-conjugated macromolecules, electronic macromolecules, molecular magnetism, functional molecules, macromolecular synthesis, supramolecular chemistry

Description: Organic molecules support mankind in the form of numerous physiologically active substances and functional materials. This research area undertakes the development of highly functional materials and the establishment of new synthetic methodology that are both environmentally sustainable and highly efficient: 1) The development of new synthetic methods of bioactive compounds for pharmaceuticals and agrichemicals ; 2) The development of organic synthetic processes utilizing characteristic properties of heteroatoms (nitrogen, sulfur, iodine, etc.) and transition-metal catalysts for organic synthesis; 3) The elucidation of the dynamic behavior of photoexcited

molecules; 4) The design of self-organizing molecular assemblies and supramolecular chemistry; 5) The development of highly energy-efficient photo-functional materials such as photochromic materials, liquid crystals, and organic EL.

Academic Research Area: Inorganic and Analytical Chemistry

Professor Kazuyuki Kakegawa ○: Environmentally sustainable ceramics materials, ash recycling, nano-organizational materials, amorphous use materials

Professor Yasuhiko Iwadate: Liquid theory, amorphous materials science, structural analysis and control, high energy irradiation, development and modification of environmentally adaptable and highly functional materials

Professor Motoi Machida (Safety and Health Organization, Chiba University): Organic and heavy metal pollutants, aqueous solution, activated carbon, adsorption, surface chemistry, water environment

Professor Masanori Fujinami: Analytical chemistry, instrumental analysis, surface science, radiation chemistry, positron annihilation spectroscopy, laser spectroscopy

Visiting Professor Koichi Chiba (National Institute of Advanced Industrial Science and Technology): Atomic spectroscopy, quantitative analysis for environmental samples, standard materials, reference materials

Associate Professor Shin Nishiyama: Inorganic materials chemistry, oxide semiconductors, structural analysis of crystals and amorphous materials, negative thermal expansion

Associate Professor Naofumi Uekawa: Materials chemistry, ceramics, nanoparticles, surface chemistry, electronic materials, soft solution processes

Associate Professor Takashi Kojima: Nanoparticles, ceramics composites, inorganic waste materials recycling

Assistant Professor Yoshimasa Amano: Water environment, lakes, eutrophication, water blooms, growth mechanism, water purification, activated carbon, adsorption

Assistant Professor Tomonori Nomoto: Molecular spectroscopy, vibrational spectroscopy, interfacial spectroscopy, Instrumental analysis, physical chemistry, photocatalyst, ultrafast laser spectroscopy

Assistant Professor Takahiro Ohkubo: Nuclear magnetic resonance, computational chemistry, high temperature chemistry, amorphous material, short-range structure

Description: Process development and performance assessment are conducted for a wide variety of inorganic materials under the keywords of new functions, high performance, and environmental neutrality. In particular, the development of substitute materials with low toxicity that do not lead to pollution as well as research related to the recycling of resources and energy are conducted in terms of fundamental research and application. In analytical chemistry, we are very interested in the behavior of the molecules localized at the surface and the interface, and various analytical methods based on the laser spectroscopy have been developed. Further the positron microscopy has been installed in order to detect the open-volume type defects such as vacancies.

Academic Research Area: Chemistry for Efficient Conversion of Natural Resources

Professor Shogo Shimazu: Catalysis, chemistry of metal complexes, green chemistry, nano-structured catalysts, molecular recognition, layered materials, chemical conversion of biomass, lignocellulose

Professor Satoshi Sato: Catalytic process, dehydration of polyols, interconversion of resources derived from plants, porous solids

Professor Nagahiro Hoshi: Surface electrochemistry, well-defined surfaces, shape-controlled nano-particles, fuel cells, surface spectroscopy, scanning probe microscopy,

Associate Professor Toshiaki Sodesawa ○: Catalyst chemistry, environmental catalyst design, solid catalyst preparation, binary

microporous bodies, chemical resources conversion process, C_1 chemistry, chemical resources circulation

Associate Professor Nobuyuki Ichikuni: Catalysis, surface science, X-ray absorption spectroscopy, photo catalysts, carbide catalysts, cluster chemistry

Associate Professor Hyuma Masu: Single-crystal X-ray structure analysis, polymorphism, molecular chirality, intermolecular interaction

Assistant Professor Masashi Nakamura: Fuel cells, surface electrochemistry, hydration structures, metal nanoparticles, functional electrodes, surface structure control

Assistant Professor Takayoshi Hara: Catalysis, supported metal catalysts, environmentally benign materials conversion, inorganic crystal compounds, highly difficult oxidative reactions

Assistant Professor Yasuhiro Yamada: Carbon materials, energy storage, thermal interface materials, phase transition materials, porous materials

Description: This research area aims to create active sites that promote efficient energy conversion by controlling surface structures in atomic and molecular scales. The area also studies material conversion processes and functional catalysts with high efficiency and selectivity for the efficient use of biomass, solar energy and fossil resources. 1) Precise synthesis of inorganic/organic nanocompounds and molecular recognition catalysts; 2) Dynamic characterization of novel nano-structured catalyst surface under reaction conditions; 3) New catalytic processes suitable for the creation of usable materials from plant resources; 4) Determination of structures of solid-liquid interfaces in atomic and molecular scales, and development of highly efficient electrocatalysts, such as single crystal electrodes and shape-controlled nano-particles.

千葉大学
大学院工学研究科

問い合わせ先：
千葉大学大学院工学研究科学務
〒263-8522　千葉市稲毛区弥生町１-33
TEL : 043-290-3885, 3887
Email : kougaku-daigakuin@office.chiba-u.jp