SDM
System Design and Management

Graduate School of System Design
and Management, Keio University

INTRODUCTION

Learn System Design and Management in English While Being in Japan
—A Gateway to New Perspectives and Distinct Careers

Broaden Your Horizons with World-Class, Cutting-Edge Knowledge

The Graduate School of System Design and Management at Keio University (Keio SDM) pursues problem solving with a "systems" approach by capitalizing on a broad range of perspectives from the natural sciences as well as from the humanities and social sciences. Mid way between downtown Tokyo and Yokohama close to both by train, Keio SDM enables students to learn the world's leading systems engineering and design thinking in both Japanese and English.
Keio SDM has a diverse student population made up of various backgrounds, age-groups, and nationalities. Not all students have a background in natural sciences and engineering; and many are professionals who are working in Japanese enterprises and government organizations. At Keio SDM students have ample opportunities to broaden their views by studying alongside these individuals as they encounter diverse values and ways of thinking.

About Keio University

Keio University is among the most prestigious private universities in Japan. It was founded in 1858 by Yukichi Fukuzawa, a leader of modern Japan who is also known as the man portrayed on Japan's 10,000-yen note. Many Keio alumni are successfully leading in a wide range of fields, including business, technologies, politics, and education. Being a Keio graduate is perceived as prestigious in Japan.

CONCEPT

Nurturing Individuals Capable of Handling Large and Complex Systems beyond Boundaries

Crisis Management

Intelligence

Defense

NPO/NGO

Marketing   Risk Analysis

Tourism   Policy Design   Empathy

DisasterRestoration

Welfare   Happiness

International Cooperation

Diplomatic System   Politics and Economics

Mobility System Management   Deep Emotion/Impression

Business Models

UX   Public Policy

Local Autonomy/ Regional (Doshu) System   Local Revitalization

Environmental Symbiosis

Systems Designer   **Project Leader**

Public Design

SDM

Communication System

Energy Management System

Cloud   Innovation   SNS

Sustainability   Movie   Music

Modeling   Internet

Medical and Pharmaceutical Systems

Space System   Model-based Systems Engineering

Universal Design   CRM

Systems for Culture and Art

Smart Grid Systems   V & V   Entrepreneurship

Future Center   Education   Venture

Systems Modeling Language (SysML)

Medical Welfare   Agriculture System

Virtual Reality   GIS

Social Enterprise

Next-generationMobility

Motivation   Manufacturing Industry

Ubiquitous System

Human Machine System

Robot

Cutting-edge Technologies

Safety/Security

Learn Systems Engineering and Design Thinking

Keio SDM deals with a multiplicity of large and complex systems. As we seek solutions, we make sure to consider social needs, such as environmental symbiosis, safety and security, cutting-edge technologies, international cooperation, and crisis management. Two pillars of problem solving methods are employed at Keio SDM. One is systems engineering, which was developed initially for the purpose of desiging large systems, including aerospace and military systems. Now it has been extended to include the social sphere. Keio SDM is the only Japanese university participating in the Council of Engineering Systems Universities (CESUN). Students can learn all about systems engineering from the basics to the cutting-edge at Keio SDM.

The second pillar is known as design thinking. It is a development method which uses techniques, such as fieldwork, brainstorming, and workshops, to generate ideas. Its aim is innovation through drawing out the creativity of participants.

With systems engineering alone, it is difficult to accommodate different perspectives of multiple stakeholders for the purpose of innovation. Design thinking, on the other hand, tends to be weak at taking a systematic approach to the shaping of ideas. Keio SDM has successfully created a development method which combines the two in a complimentary way. At Keio SDM students learn how to create an optimal fusion of systems engineering and design thinking. This equips them with the capability of tackling large and complex systems.

Developing a Wealth of Skills

Keio SDM nurtures future systems designers and project managers who are capable of designing and managing multiple systems. One needs to have a diverse set of skills in order to coordinate with multiple stakeholders for the purpose of creating systems. Keio SDM offers a range of programs to produce individuals with a wide spectrum of skills and abilities.

POLICY

Student Admissions Policy

For the master's programs, we admit both persons aspiring to conduct research and put into practice the design and engineering of innovative technological systems that will contribute to resolving many of the large-scale and complex issues of the modern day, and those aspiring to research on and implement the leadership and management required to propose solutions to issues in the diverse social systems of today and guide these projects to success. In order to foster personnel befitting of these degrees, we admit people from many walks of life, including persons advancing to graduate school directly after completing their bachelor degrees and those with hands-on experience (early career/seasoned professionals) at organizations in the public, private, and other sectors. Screenings are conducted to comprehensively assess whether candidates have sufficient aptitude, skillsets, and desire to actively study alongside students from diverse backgrounds and put what they learn to practical use in the real world.

For the doctoral programs, we admit both persons aspiring to support various fields as researchers and social practitioners through advanced academic research on the design and engineering of innovative technological systems that will contribute to resolving many of the large-scale and complex issues of the modern day, and those aspiring to contribute to various fields as researchers and social practitioners through proposing solutions to issues in the diverse social systems of today and advanced academic research on the leadership and management to guide these projects to success. In order to foster personnel befitting of these degrees, we admit people from a wide range of spheres across generations, including persons with hands-on experience in the public and private sectors (early career/seasoned professionals) as well as students who have completed a master's degree program. Screenings are conducted to comprehensively assess whether candidates possess academic and research capabilities equivalent to those required for the master's program, the initiative to plan and conduct research, and sufficient aptitude, skillsets, and desire to put what they learn to practical use in society as specialists, in addition to whether they have made the preparations necessary to pursue their research after admission.

Curriculum Policy

On the master's program, students will master comprehensive management skills including strategic system engineering methods and communication skills in core subjects, and work on a "design project" course embracing jitsugaku or practical learning. In addition, we offer a variety of courses for students to acquire a broader global perspective. For the master's program in System Engineering, students primarily engage in research over a two-year period (standard) in fields related to the design of technological systems, presenting their findings, etc.,
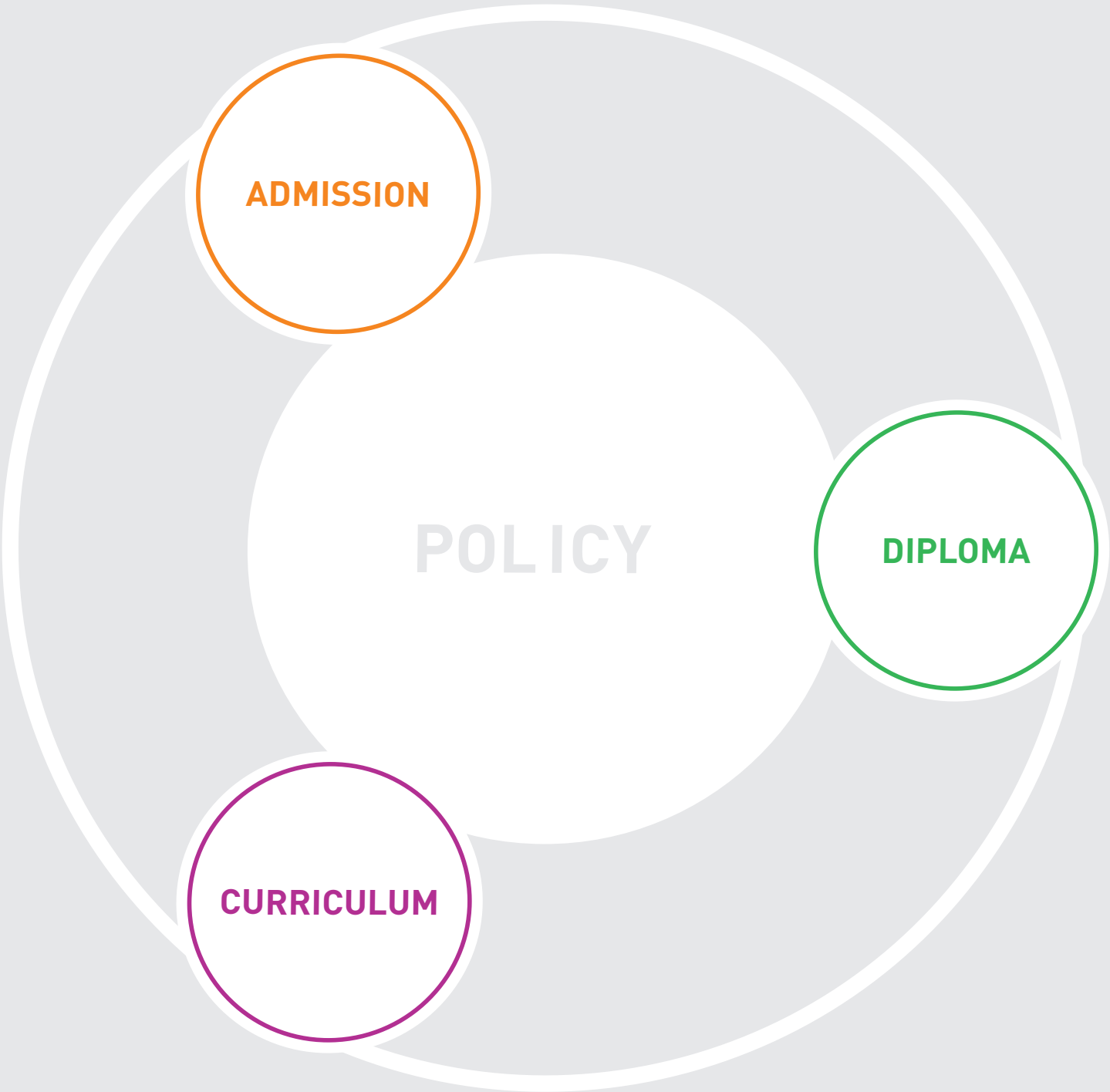
in Japan and internationally and compiling these into a master's thesis. For the master's program in System Design and Management, students primarily engage in research over a two-year period (standard) in fields related to addressing issues in social systems, which they then compile as a master's thesis.

On the doctoral programs, it is possible for students to take courses taught as part of the master's programs in order to study required subjects (especially core subjects, etc.). For the doctoral program in System Engineering, students primarily engage in research over a three-year period (standard) in fields related to the design of technological systems, on which they compile a doctoral dissertation while being positively evaluated by external specialists through presenting their findings in Japan and internationally. For the doctoral program in System Design and Management, students primarily engage in research over a three-year period (standard) in fields related to solving problems in social systems, on which they compile a doctoral dissertation while being positively evaluated by external specialists through presenting their findings in Japan and internationally.

In all of the degree programs, students can take lectures given by renowned professors from overseas while still in Japan through SDM's collaborations with MIT, Montclair State University, TU Delft, INSA, Politecnico di Milano, and others. In addition, we actively implement student exchange programs with all these universities. Due to the wide range of issues tackled by SDM, students conduct research while eliciting guidance from various related parties, which they compile into a thesis or dissertation.

Diploma Policy

Both the master's and doctorate programs have degrees in "System Engineering" and "System Design and Management."

Completion of studies for the Master of System Engineering means that students learn the core subjects and project subjects, and after studying other courses to acquire a broader global perspective, compile their research in fields primarily related to the design of technological systems into a master's thesis. Completion of studies for the Master of System Design and Management means that students learn the core subjects and project subjects, and after studying other courses to acquire a broader global perspective, compile their research in fields primarily related to solving problems in social systems into a master's thesis.

Completion of studies for the Doctor of System Engineering means that students have academic papers in fields primarily related to the design of technological systems positively evaluated by specialists, or have a system they created positively evaluated by specialists, compiling the outcomes of which into a doctoral dissertation. Completion of studies for the Doctor of System Design and Management means that students have academic papers in fields primarily related to solving problems in social systems positively evaluated by specialists, or have a system they created positively evaluated by specialists, compiling the outcomes of which into a doctoral dissertation.

CURRICULUM

Knowledge and Experience
—Both Essential for Developing Capability

Our curriculum aims to build collective strengths by combining knowledge with experience. Students first gain knowledge from lectures on systems engineering, design thinking, management capability, and specialized subjects. They are then invited to work on real-life projects and explore practical solutions. With our approach of combining knowledge with experience, students grow into integrated professionals who are capable of building and managing systems with precision.

Major Subjects in Political, Economic and Business Systems

Major Subjects in Systems and Socio-Tech Engineering

Foundation of Model-Based Systems Engineering
Frontier Project Management
Practice of System Design and Management
Architecture for Digital Transformation
Design Science and Project
Space System Engineering
Spatial User Interface
Program Management
Service Engineering
Entrepreneurship Design Theory
Business Process Modeling and Management
Decision Making and Risk Management under Uncertainty
Simulation and Gaming for Project Design
Poltical System
The Mechanism of Accounting System in the Context of Economic System
Social Survey Methods
Business Analysis and Synthesis
Technical Entrepreneurship
Well-Being Management
Analytical Methods for Humanities and Social Sciences

Model-Based Conceptual Design and Management
Network and Database Systems
Foundation of Abstraction for System Thinking
Basic Theory and Practice of Artificial Intelligence

Major Subjects

Recommended Basic Subjects
Communications
Project Management Fundamentals
Statistics and Data Processing for System Design

Recommended Advanced Subjects
Workshop Design Methodology for Innovation
Systems Approach for Social Systems
Modeling and Simulation of Systems

Required Subjects

Core Subjects
Introduction to System Design and Management
System Verification and Validation
Special Lectures

Project Subjects
System Architecting and Integration
Project Management
Design Project
Competency and Skill-Building

Special Research Subjects
Research on System Design and Management
Research on Project Design and Management

Sustainable Urban System 1
Sustainable Urban System 2
Studios for Urban System Design
System Assuarance
Innovative Design Methodology
Human Relations
Human Interface
Virtual Design

Major Subjects in Safe, Reliable, Human, Symbiotic and Innovation Systems

Classes Offered in the Master's Course

Students in the master course learn the basics of systems engineering through the mandatory core subjects. Additionally they take specialized subjects covering specific fields and recommended advanced subjects covering multidisciplinary topics according to their interests. By creatively combining these subjects, students can broaden their knowledge towards a wide spectrum of subjects.

Classes are offered in Japanese and/or English. It is possible to complete the master course by selecting only classes in English. Core subjects are offered both in Japanese and English; Japanese classes normally begin in April while English classes begin in September.

It takes practical experience to effectively design and manage real-world systems. Students in the first year master course learn design thinking and work on real-life issues in the Design Project. They then proceed to practical research in special research subjects; and the results are compiled in their theses. At Keio SDM we set high standards for masters research.

The doctoral program offers more specialized research opportunities. Doctoral students can take masters classes according to their interests. Quite a few of those theses end up presenting at international conferences.
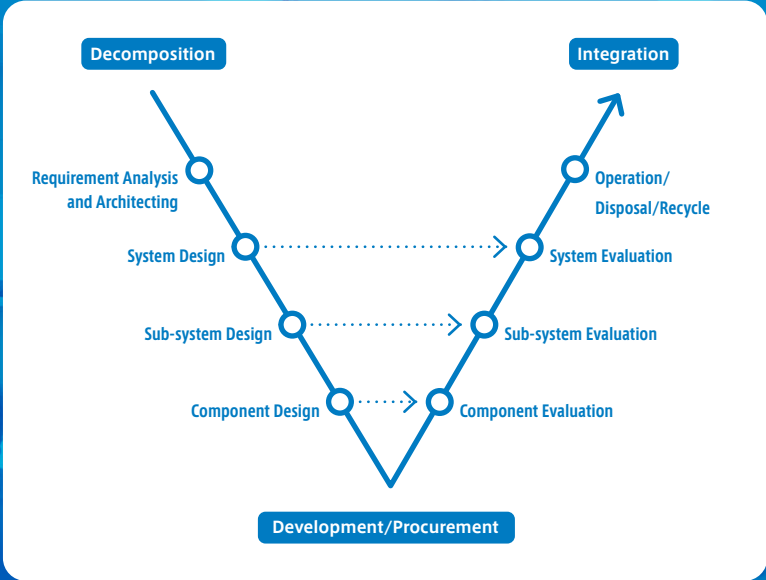
Students in the master course first learn the basics of systems engineering and other fundamental skills necessary to deal with systems. Building on this, they acquire knowledge about systems of various fields in specialized subjects. Additionally they learn design thinking in the Design Project.

Linking Knowledge

Students first learn the V-model, an important concept of systems engineering.

The V-model structures systems by decomposing requirements and integrating parts and their validation. This model can be used as a broad framework to capture how the entire process relates to each specific part. One can apply the model to system development of various fields, including those which are scientific and technical, social, and human.

Building on basic knowledge of the V-model, students take a variety of specialized subjects. Students can learn in a systematic and structured manner by using the model as a common framework, linking a broad spectrum of knowledge.

At Keio SDM we use the V-model to decompose, integrate, and evaluate by precisely defining the diverse requirements of the stakeholders, by sharing information, and by creating complete pictures of systems.

Decomposition | **Integration**

Requirement Analysis and Architecting → Operation/ Disposal/Recycle

System Design ····> System Evaluation

Sub-system Design ····> Sub-system Evaluation

Component Design ····> Component Evaluation

Development/Procurement

Intensive Lectures in English

Keio SDM's strength is not only that the curriculum can be completed solely in English. A series of intensive lectures are offered in English by the world's leading professionals and researchers from different fields.

This international learning environment as such makes Keio SDM an ideal environment for the growth of globally-minded professionals who are capable of accommodating different cultural perspectives.

List of Past Intensive Lectures (with titles as they were at the time)

"System Architecture and Integration"
Prof. Rashmi Jain (National University of Singapore)

"Supply Chain Management and Business Games"
Prof. Paul Schoensleben (ETH, Switzerland)

"Collective Dynamics of Firms"
Prof. Dr. Frank Schweitzer (ETH, Switzerland)

"Technical Entrepreneurship & Management"
Prof. Duncan Moore (University of Rochester, US)

"Risk Management"
Prof. Gilles Motet (INSA, France)

"Space Applications"
Prof. Dipl.-Ing. Heinz Stoewer (President Space Associates GmbH, Germany)

"Stanford Center for Design Research Workshops"
Dr. Larry Leifer (Stanford University, US)

"Object-Process Methodology (OPM) with Application to Systems Engineering"
Prof. Dov Dori (MIT, US)

From Basics to Application —the Design Project

The Design Project aims to propose innovative systems by using the system design and management method developed collectively by Keio University, MIT, Stanford University, Delft University of Technology, and the University of Adelaide. In the Design Project students put systems engineering into practice while learning about design thinking.

In the Design Project students begin with the basics and then move on to practical learning. After taking a number of lectures taught by guest lecturers from partner universities overseas, students work in groups to work on themes proposed by various organizations. The proposers often include leading Japanese companies; and international students have a great opportunity to get acquainted with the unique characteristics, strengths, and cultures of Japanese enterprises.

Examples of Solutions Derived by Students with the Theme "Safety and Security"

"Building New Brand Image of Safety and Security Using Positive Cycle Business Model"
Proposer company: Adidas

"Portable Multi Energy Backpack System for Refrigerating Vaccines"
Proposer company: Kokusai Kogyo group Infrastructure Innovation Institute, Inc.

"Safe and Secure Solar Power Generation in Japan - Dual Mode Solar Panel System: Proof of Concept"
Proposer company: Delft University of Technology

"Safety Premium Point System"
Proposer company: Suzuki Motor Corporation

"Design of Bicycle Simulator to Reduce the Risks of Traffic Accidents"
Proposer company: Toshiba System Technology

Keio SDM emphasize the importance of hands-on experience.
Students are encouraged not only to gain textbook knowledge about systems
but also to experience real-life situations, to clearly articulate issues,
and to come up with innovative, feasible solutions.
It is when one is actually seeking solutions to complex systems that most discoveries and realizations come.
We believe in experiential learning, that one learns most by doing.

Learning by Doing
—Experiential Learning

Insight into the "On-Site" Realities of Japan

Keio SDM has strong ties with private companies. This means our students have the privilege to observe "on-site" scenes of Japanese companies through various opportunities. For example, we arrange visits to distinctive factories as a part of the curriculum. In the Design Project students have the opportunity to visit the workplaces of proposing companies and work collaboratively with their staff members. Furthermore, Keio SDM has a great number of on-going joint research projects with private companies, facilitating students to have close and frequent communication with the companies. Many faculty members of Keio SDM come from private firms; and some internship opportunities can be facilitated for our students by virtue of their strong connections with the companies. Keio SDM offers its students valuable opportunities to engage with Japanese companies, providing opportunities to gain insight into the secret of their strength and the "on-site" realities.

Laboratory Participation and Thesis Writing
The Special Research Subject

The master course centers around the Special Research Subject. Students select a specific system and take part in a relevant laboratory. Their research results are compiled into their masters theses. As in the case of the doctoral course, students establish their own themes and conduct extensive research. Research experience helps students deepen their knowledge, equipping them with skills that can be used immediately upon graduation in their work of research and/or development.

Examples of Technical System Research

Smart Grid
Mobility System
Virtual Reality
Remote Real-time Communication
Optical Communication
Robotics
Space System

Motivation
Happiness/Desire/Empathy
Human-machine Interface
Culture/Art
Entertainment
Organizational Theory
Cognitive Science

Policy
Business Model
Agricultural System
Regional Revitalization/Tourism
Universal Design
Environment/Resource
Security/Peace

Examples of Human Systems   **Examples of Social System Research**

Study Case

Portfolio Optimization for Environmentally-Conscious Automobiles

Many environmentally-conscious automobiles are being developed and sold, such as the ones based on electric, fuel cell, natural gas, and gasoline-electric hybrid technologies. We use the system approach (simulation and system optimization) to study portfolio maximization—analyzing which type of automobile should be brought to the mainstream given the various constraints, such as those related to environment, energy, resources, aging population, and development in emerging nations.
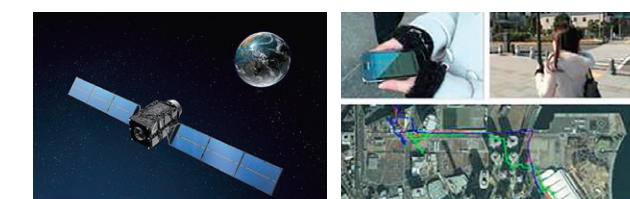
Resilient Community Design:
Knowledge Creation for Safety and Security
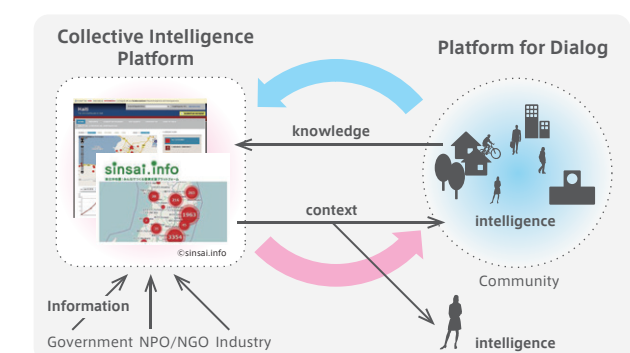
Communication Design Process: Knowledge Creation for Safety and Security

Organizational Management
Establishing Culture and
Safety Consciousness within Companies

We conduct research into ways in which companies can develop a positive culture and work atmosphere in which staff members feel motivated and rewarded. Our research also asks questions concerning how to establish excellent companies with a high level of safety consciousness, risk management, and profitability. We study companies' strategies that enable effective management—creative ways to motivate employees while nurturing teamwork and good communication within an organization.

Disaster-Prevention Message Delivery Service

At Keio SDM we use smart systems, such as IT systems and space systems, in order to create socio-technical services and their processes. In search for resilient community design process, we do research on a disaster-prevention message delivery service using a satellite and GPS receivers. We study a distributed autonomous cooperative community design process that is resilient and based on the fusion of two platforms: dialogue and IT.
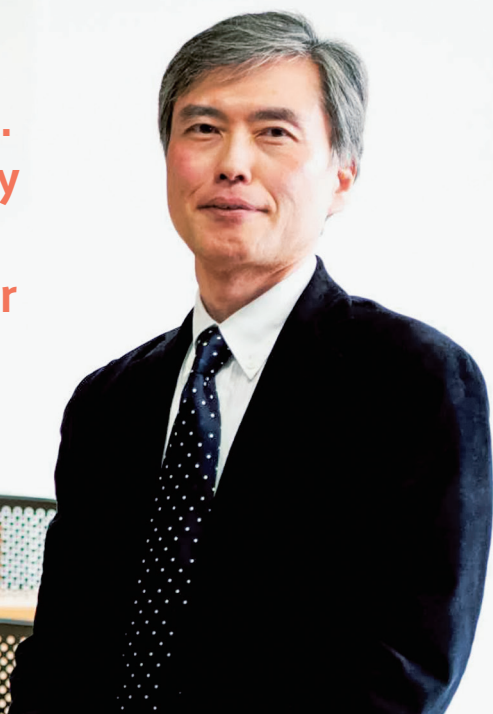
MESSAGE

We still lack a sufficient understanding of systems engineering and systems thinking. SDM must be a place where faculty and students take their work seriously in order to have a greater impact on society as a whole.

Hidekazu Nishimura
Dean
Graduate School of System Design
and Management

Then & Now: Looking Back on the History of SDM

Keio SDM will be reaching its 17year milestone in 2024. When we first opened, our research was headed in a direction that was so cutting edge that it got little attention from the media. The first faculty members at SDM were brought together from across different fields, and there was a real sense of comradery among them, each person trying in their own way to understand what a "system" actually was—often by trial and error. Just five or six years later, the world was beginning to discuss the need to think about things as holistic systems. SDM takes pride in knowing that it has contributed to this conversation.

We now have a deeper understanding of design and systems thinking, or as we refer to it, "systems engineering." We are currently in the middle of the second decade since the founding of SDM, and it is a good time to get back to basics—to taking on challenges that require us to roll up our sleeves and work together like we did back then. Now is not the time to maintain the status quo. It's time to look back on the things we built our success on so that we may find a way forward.

Technology, Well-being, and the Baseline

In 2007, as we were gearing up to launch SDM the following spring, the plan was to approach systems engineering from the so-called hard sciences. It was at this time that we were approached by the board of trustees, who convinced us to include fields from the humanities and social sciences as well. This was quite a challenge for us at the time, but SDM has since gone on to embrace diversity, in the purest sense of the word, by engaging in truly transdisciplinary research. That approach has led to new and unexpected fields of research, including topics like "happiness research," although recently it has been replaced by the English expression "well-being." In my current research, I am exploring the safety of autonomous vehicles; specifically, eliminating unsafe conditions to create a baseline for vehicle safety. We take the same approach with "well-being." If we can judge a situation not to be unwell, then we can create a baseline for "well-being." And beyond that baseline there is no limit for vehicle safety and well-being alike. But first, it is important to establish this concept of a baseline.

In the coming years, the integration of AI will alter our world more than ever before. For example, it has been pointed out that even if an autonomous vehicle AI is trained to recognize people in order to avoid collisions, an AI trained using only images of white people will struggle to identify black people. People who are in the design and development process must think critically and ethically about a technology and its implications. Furthermore, if an automated driving system is supposed to exist for the well-being of people and of society as a whole, then we must also define what well-being is for that automated driving system.

This complex and vast society we live in is starting to show many cracks in the seams. People are working, with good intentions, and developing new technologies to create a more convenient society. However, is this really benefitting people and the well-being of our society? Keio SDM must be a place where we think logically about these complex issues from the holistic standpoint of systems thinking.

Setting Aside Specialization

I often talk to my students about setting aside their specialties. Once you put your expertise to one side, you can start thinking in terms of systems. For example, although I have been a control engineering researcher for many years, systems engineering begs the question: "Is control even necessary?" That is not to say that expertise is not important. When I say "set aside," I do not mean to write off expertise as inconsequential. However, in taking a systems engineering approach, you have to go beyond looking at things within your own field of expertise to capture the scope of the entire system from multiple aspects.

The reason I first became interested in Systems Modeling Language (SysML) was that my expertise is in control engineering, a topic that was covered in the book A Practical Guide to SysML. I was very lucky to learn about the world of systems engineering and broaden my horizons beyond the concept of control, even having the opportunity to do the translation for the book. In April of 2019, I published The Systems Engineering Handbook, 4th Ed., which describes the essence of systems engineering. I think these experiences at SDM really embody the Keio maxim of hangaku-hankyo, or "learning while teaching, teaching while learning," as academic faculty continue to learn alongside their students. I think students also feel this to be true, and I believe this is the real appeal of SDM.

Toward the Next Ten Years

I'm responsible for the mandatory systems engineering courses at SDM, but it is not the kind of content that can be easily understood in just fourteen 90-minute lectures. Only after actually putting it into practice do students truly feel like they understand. I often ask students if they can explain what it really means to "understand" something. Even faculty members like me cannot say we truly understand something without putting into practice what is written in the System Engineering handbook. Real learning is a desire to understand more. I want to make SDM a place that encourages more and more dialogue, a place for faculty and students to work together to deepen their understanding. A graduate student from China once confided to me over conveyor-belt sushi that he thought Japanese students were not proactive enough. I want to bring on more students who take charge and will do whatever it takes to comprehend something—those who are serious about learning. I think the student and faculty body is already quite diverse at SDM, but I would like to invite even more international students to come and make it a truly global environment.

SDM has already been applauded for its work by the public and private sectors, by the Japanese government and corporate world. I want to answer the call and further strengthen our ability to contribute to society as a whole. But we must interact, share information, and explore new directions with others, rather than continue working alone. Systems engineering, design thinking, and project management—these must be front and center in our research and education and practiced diligently to push the discipline of SDM forward.

FACULTY

The backgrounds of Keio SDM's faculty vary from industrial experience to active careers in the international arena. Their career paths and research areas are so diverse that new research ideas and activities are being generated every day at Keio SDM through borderless intellectual interactions.

Diverse Careers and Fields of Research Create New Challenges

Supervising Professors

Hidekazu Nishimura
Dean, Professor
Research and education interests: Model-Based Systems Engineering, System Safety, Control Systems Design, Universal Design, Business Process Modeling Notation and Business Process Management, Systems Modeling Language, Architecture-Based Socio-Technical Systems Management, Automated Driving Vehicle and Related Studies

Hiroko Inokuma
Professor
Worked: Ernst & Young ShinNihon LLC., Tohoku University - Graduate School of Economics and Management(Accounting School), Musashi University - School of Liberal Arts and Sciences, University of London (LSE) Parallel Degree Programme
Research and education interests: International Accounting, Financial and Business Accounting, Auditing, Tax Accounting, Economic System Design
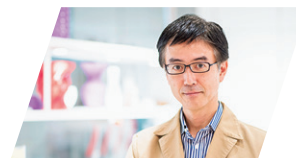
Makoto Ioki
Associate Professor
Worked: Mitsubishi Electric Corporation, Japan Space Systems
Research and education interests: Systems engineering, Innovative Thinking Education, Satellite system and Fault-tolerant system design.

Naohiko Kohtake
Professor
Worked: Japan Aerospace Exploration Agency, European Space Agency
Research and education interests: Systems engineering for socio-technical system (education system, space system, sports system, urban system), System verification and validation, Computer science

Takashi Maeno
Professor
Worked: Canon Inc., the University of California, Berkeley, Harvard University, and the Faculty of Science and Technology of Keio University
Research and education interests: Human-machine system design, social system design, systems thinking, and systems philosophy

Masahiro Niitsuma
Assistant Professor
Worked: Ritsumeikan University, Aomori University, and Das Bach-Archiv Leipzig
Research and education interests: Artificial intelligence, Bach studies, and Bodily tendency (cyclic aspects of human personalities based on habitual patterns of bodily movements).

Tetsuro Ogi
Professor
Worked: Mitsubishi Research Institute, Inc., The University of Tokyo, Tsukuba University
Research and education interests: Human interface, virtual reality, IoT, tele-immersive communication, and visual simulation

Seiko Shirasaka
Professor
Worked: Mitsubishi Electric Corporation
Research and education interests: Space systems engineering, system development methodology, and system safety

Naoko Taniguchi
Professor
Former position: Associate Professor, Tokyo Institute of Technology
Research and education interests: Political Science (political behavior/process/policies), Public Systems (administrative/regional/civic/media systems), and Methodologies(statistics/surveys/experiments)

Tetsuya TOMA
Professor
Former Advanced Product Development Specialist at 3M Company
Research and education interests: Program/project management and communication design for communities such as medical/health care, education or local resource utilization

Takahiro Yakoh
Professor
Worked: NKK Corp., Faculty of Science and Technology of Keio University, The University of Tokyo, Vienna University of Technology, Shinshu University
Research and education interests: Coding theory, Computer network, Human-computer interaction, Signal processing, Machine learning, and Digital transformation

Yoshiki Yamagata
Professor
Worked: National Institute for Environmental Studies. Currently affiliated at IPCC, IIASA, ISM and Univ. of Tokyo as visiting professor.
Research and education interests: Develop Urban System Design framework to co-create cities achieving "environment" and "health" sustainability for architecture, transportation and human behavior systems.

Visiting Professors and Executive Advisors

Vittal Anantatmula
Guest Professor (Global), Keio University
Professor and Director of project management programs, Western Carolina University
Research Interests: project management teams, risk management, knowledge management effectiveness, project management maturity, and leadership.

Laurent Balmelli
Guest Professor (Global), Keio University
Since 2003 he has joined the SysML standard team and became one of the lead authors of the SysML language specification 1.0. He is currently working on Strong Network based in Switzerland, while maintaining teaching positions in Innovation, Design Thinking and Conceptual Product Modeling.

Peter Buist
Guest Professor (Global), Keio University
Manager of the European Union Agency for the Space Programme (EUSPA)
Areas of expertise: Global Navigation Satellite System (GNSS), Space Systems Engineering

Soowon Chang
Guest Lecturer (Global), Keio University
Assistant Professor, Purdue University
Her research revolves around paradigm shifts in human-urban-building interactions with intelligent application of disruptive technologies in the future smart cities for sustainability, economic growth, health, and overall quality of life.

Olivier L. de Weck
Guest Professor (Global), Keio University
Professor, Aeronautics and Astronautics and Engineering Systems, MIT
He is a leader in systems engineering research. He focuses on how complex man-made systems such as aircraft, spacecraft, automobiles, printers and critical infrastructures are designed and how they evolve over time.

Pieter J. Fourie
Guest Associate Professor, Keio University
Senior research consultant with Urban Research and Planning
He specialises in population synthesis, simulation modelling of current and emerging modes of transportation, flood evacuation modelling, and big data-driven transportation planning.

Rashmi Jain
Guest Professor (Global), Keio University
Professor, Montrclair State University
She is a prolific scholar and her research interests intersect systems architecture and design, systems integration, service operations management and business process analysis and management. She has worked on several research grants as Principal Investigator on the relevant topics.

David Lavallee
Guest Professor (Global), Keio University
Professor of Duty of Care in Sport in the School of Applied Sciences, Abertay University
Areas of expertise: Design and Management of Solutions to Help Protect the Positive Impact of Sport.

Yoshiaki Ohkami
Honorary Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: Design and management of large scale space system, strategic systems engineering

Taketoshi Hibiya
Honorary Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: Large scale systems engineering (basic science)

Shinichiro Haruyama
Executive Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: free-space optical communication, architectural ICT technology, and reconfigurable systems.CEO of Craft Brain LLC.

Mikako Hayashi
Executive Advisor of SDM Research Institute
Areas of expertise: Community building, Symbiosis of rural and urban, Food and agriculture, Sustainable agriculture, Green tourism

Masaru Nakano
Executive Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: sustainable city, sustainable manufacturing,and business games

Kenichi Takano
Executive Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: Risk management of large and complex system as in nuclear power plants and chemical production plants

Tomohiko Taniguchi
Executive Advisor of SDM Research Institute
Former Professor of SDM
Areas of expertise: International Political Economy, Japan's Strategic Diplomacy and Public Diplomacy. Formerly Prime Minister Shinzo Abe's speech writer

Atsuo Yoshida
Executive Advisor of SDM Research Institute
Areas of expertise: Structuring of programs for "management support, business startups, business rehabilitation and business succession" based on financial accounting strategy, etc.

I like the cross-cutting approach of Keio SDM

I chose Keio SDM because I was interested in the automobile industry and looking for a Japanese graduate school which offers a relevant course in English.

I am satisfied with the number of classes that Keio SDM offers in English. I also like its concept of learning more than engineering. At Keio SDM we cover a wide range of subjects, such as design, business, economics, and policies. The curriculum is designed in such a way that we get our hands on real projects after going through theories. I find this to be highly effective. I feel encouraged to be creative as students here are eager to work together and take pleasure in meeting new cultures and individuals of different backgrounds.

I spend weekends doing a variety of things, including going to parties, attending concerts, and visiting design exhibitions. Something exciting is always happening in Tokyo; it's never a bore. I feel that Tokyo has countless possibilities to offer.

Kamila Romejko

Completed Doctoral Degree in September 2017
Completed Master's Degree in September 2014
Completed Master's Degree in International Economic Relations at Warsaw School of Economics

Diverse Course Offerings and Student Backgrounds Help Advance My Career

I am a researcher of ground-based satellite control operations at Vietnam National Satellite Center, currently on the Center's study abroad program to Japan funded by a Japan-Vietnam intergovernmental project. I chose Keio SDM over other programs because I wanted to learn how to manage large and complex systems. I am glad I did so; SDM's curriculum teaches me full-fledged knowledge of systems thinking and design thinking. I would like to mention three characteristics, among many others, that make SDM special. The first characteristic is its diversity. SDM offers a wide variety of courses ranging from technology, politics, and social sciences to many other subjects for its students to earn across disciplines. Students from such diverse backgrounds as music, architecture, and management study together and many of them are working students. I believe it is a plus for my career to learn from their experiences. The second is internationality. SDM students come from all walks of life and every corner of the world. The third is the depth and the breadth of knowledge that the faculty members possess. Many teachers go out of their way to help students even after school.

Do Xuan Phong

Completed Master's Degree in September 2015
Graduated from the Department of Electronics and Telecommunications, Hanoi University of Science and Technology
Current employment: Vietnam National Satellite Center

SDM studies present a unique perspective through which to understand the complexity of the world.

VOICE

Message from Current and Former Students

Open-Minded Students with Spirit of Solidarity

I chose Keio SDM because I wanted to deepen my knowledge of systems engineering; at the same time I was interested in learning designs and creativity in addition to management. I think that creativity requires us to look at things from multiple dimensions and to integrate the pieces. South Africa and Japan have completely different cultures and ways of thinking. For example, work and personal life are not mixed up in South Africa; whereas in Japan the lines between work and private life blur. Focusing on such differences, we may be able to generate innovative ideas for human development and marketing activities.

Students are all open-minded and willing to help one another at Keio SDM. At first I felt nervous because of my limited Japanese language skills. In the "Big Room" where students gather, however, I feel free to talk to my peers just about anything without hesitation. This helps me relax and enjoy the studying abroad experience at Keio SDM.

John Tainton

Completed Master's Degree in September 2013
Graduated from the Department of Systems & Industrial Engineering, University of Pretoria
Previous employment: overseas subsidiary of an automobile manufacturer

International Opportunities Just A Click Away

I did my bachelor's degree in electrical engineering in my home country of Zambia and had heard about the System Design and Management program at MIT when I stumbled upon Keio SDM in an online search. After successfully applying for a Japanese government scholarship, I joined the master's program in September 2016. I am now a Ph.D. student, and both programs have exceeded all of my initial expectations.

At Keio SDM, you put problem-solving skills into practice through research, gaining plenty of hands-on experience along the way. During my master's program, I had to balance coursework with my research in Cambodia, where I had a real difference in people's lives. In the Ph.D. program, on the other hand, I have been identifying unique, unprecedented issues that add value to my field of study. And you can apply to Keio SDM with just the click of a button, no matter where you are in the world. If you're looking for a life-changing experience, I would say there's no better place than Keio SDM.

Naomi Simumba

Completed Doctoral Degree in March 2022
Completed Master's Degree in September 2018

FAQ

Frequently Asked Questions

Q1
What kind of scholarships do you have?

There are a number of scholarships for international students, such as Keio "Design the Future" Award for International Students, as well as different scholarships provided by Keio University, Japan Student Services Organization (JASSO), the government of Japan, and other private foundations. All scholarships aim to enable personally and academically outstanding students in need of financial assistance to continue and focus on their studies and research. Most of the scholarships are targeted towards regular students who are on a student visa and studying at their own expense. Please follow the link below for more information regarding scholarships.

http://www.ic.keio.ac.jp/en/life/scholarship/intl_student.html

Please see below for more information.
www.global.keio.ac.jp/en/

Q2
I do not speak Japanese. Can I still be admitted?

The answer is yes, you can still be admitted to Keio SDM even if you do not speak Japanese. We give entrance examinations in English; and students can choose to complete the course using only English. Having recognized the importance of internationally competent staff from the very beginning of its establishment, Keio SDM has administrative staff members who can assist in multiple languages. As for the faculty, those who have been educated and/or trained overseas and have sufficient language abilities are assigned to assist international students.
If you wish, you can learn basic Japanese by taking Japanese classes. The university has well-established Japanese language education which began in the 1950s.

Q3
I cannot come to Japan for the entrance examination.

You can send your application documents by post regardless of whether you reside inside or outside of Japan. You will be called for an interview if you pass the document review. There is no need to come to Japan for an interview as we can conduct it online, using technologies such as zoom, for those who reside outside of Japan. Please refer to our examination literature for more details.

Q4
Can I get help with accommodations?

Keio University has a number of reasonable accommodations for international students. In the vicinity of Hiyoshi Campus, where Keio SDM is located, there are a number of dormitories with easy access to the campus, such as Shimoda Student Village (designed for international students), dormitories for both Japanese and international students. Each dormitory has Japanese residence assistants who facilitate interactions among students and provide daily life support especially for international students.
For international students who wish to rent apartments privately, the university can introduce real-estate agents who can provide services in English. We also have an insurance scheme whereby the university acts as the guarantor.

www.ic.keio.ac.jp/en/life/housing/ryu_boshu.html

Q5
What kind of future careers do international students have after Keio SDM?

International students take on a variety of career paths after Keio SDM; some join Japanese companies; some return to their countries to work; and others go on to further education. Almost half of our Japanese students are company employees, and many of the faculty members come from private firms. As a student you also have ample opportunities to connect with companies through the Design Project and other research work. Many international students have made use of these opportunities to get jobs with Japanese companies. Because Keio SDM graduates are internationally-minded and capable of navigating in different cultures, many also find opportunities within international enterprises.
Many alumni are now playing active roles in various fields and industries. The network you will encounter by studying at Keio SDM will be an asset to your future business and career. We have seen new business started up through participation in our network.

Q6
Do you have affiliated schools? What kind of arrangements do you have with these schools?

Keio SDM has collaborated with Massachusetts Institute of Technology (U.S.), Stanford University (U.S.), Delft University of Technology (the Netherlands), and the University of Adelaide (Australia) to develop an educational method for design projects. At Keio SDM we are putting this into practice in one of the subjects, the "Design Project", thereby continuing to improve upon the educational method. We also have international exchange programs. The partner schools include: MIT, Stanford, Delft University of Technology, the University of Adelaide, National Institute of Applied Sciences Toulouse (France), the Politecnico di Milano (Italy), and Purdue University (U.S.). Every year a number of students come from these schools to study at Keio SDM.

ADMISSION

Major Discipline	Admission Quota	Degrees Awarded by SDM
System Design and Management	Master's Program 77 persons	Master's Degree (System Engineering) Master's Degree (System Design and Management)
System Design and Management	Doctoral Program 11 persons	Doctoral Degree (System Engineering) Doctoral Degree (System Design and Management)

(Unit: Japanese Yen)

Fees Payable upon Admission	Master's Program	Doctoral Program
Students admitted in April	1,982,600	1,202,600
Students admitted in September	991,350	601,350

* Academic fees are charged per academic year. The fees payable upon admission are as shown on the left.
* The fees can be paid in two installments in the Spring and Fall semesters.
* The fees of students admitted in September only show the fees for the Fall semester of the year of admission. The fees for the Spring semester are to be paid by the end of April.
* The fees are subject to change.

Scholarships

Various scholarships are offered to students who have excellent academic records and need financial aids. Detailed information on scholarships for international students are indicated below.

http://www.ic.keio.ac.jp/en/life/scholarship/intl_student.html

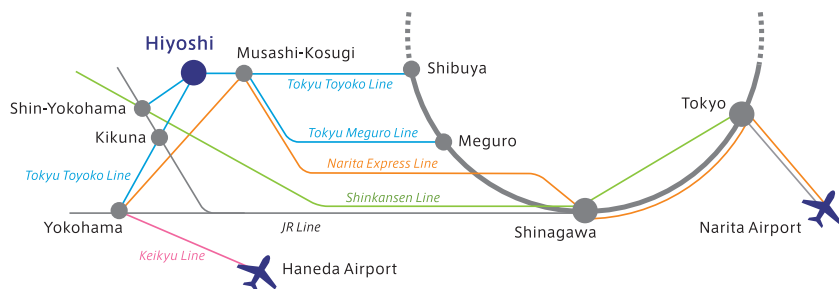| JST Doctoral Program Student Support Project	Assistance period	Assistance amount	Note
Keio University implements a program for the "Nurturing of doctoral students who will map the grand designs for future society," in doctoral programs using grants from the JST project "Support for Pioneering Research Initiated by the Next Generation." The purpose of this program is to nurture the outstanding and highly-driven doctoral students who will be responsible for the future course of science, technology, and innovation in Japan.	A maximum of three years with the upper limit set at the minimum number of years required for completion.	• Amount to cover living expenses: 2.2 million yen per academic year • Research funding: Base payment of 300,000 yen per academic year • Assistance subsidies for pioneering initiatives: An appropriate amount (up to 1 million yen)	Students with a stable income exceeds 2.4 million yen per year are not eligible.

● Admission
http://www.sdm.keio.ac.jp/en/admission/

● Application Guidelines
http://www.sdm.keio.ac.jp/en/admission/guideline_en.pdf

✕ NOTE ✕

Access: A one-minute walk from Hiyoshi Station
(Tokyu Toyoko Line, Tokyu Meguro Line, Tokyu Shin-Yokohama Line, or Yokohama Municipal Subway Green Line)

• 18 minutes by express train from Shibuya Station to Hiyoshi Station. (16 minutes by commuter limited express)
• 12 minutes by express train from Yokohama Station to Hiyoshi Station. (10 minutes by commuter limited express)
• 6 minutes by express train from Shin-Yokohama Station to Hiyoshi Station.
• Limited express trains on the Tokyu Toyoko Line do not stop at Hiyoshi Station.

Hiyoshi
Musashi-Kosugi
Shibuya
Tokyu Toyoko Line
Shin-Yokohama
Tokyu Meguro Line
Tokyo
Kikuna
Meguro
Narita Express Line
Tokyu Toyoko Line
Shinkansen Line
Yokohama
JR Line
Shinagawa
Narita Airport
Keikyu Line
Haneda Airport

Graduate School of System Design and Management
Keio University

www.sdm.keio.ac.jp/en

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