*This document is a translation from the authoritative Japanese version.
The Japanese version shall be the authorized version; the English translation is for reference only.

2020 Guide to Entrance Examinations Master's/Doctoral Program Department of Systems Innovation

Graduate School of Engineering, The University of Tokyo

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Graduate School of Engineering, The University of Tokyo
7-3-1, Hongo, Bunkyo-ku, Tokyo 113-8656, Japan

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2020 Master's Program

This document contains important information regarding entrance examinations at the Department of Systems Innovation and is a supplement to the Guidelines for Applicants to the 2020 Master's Program, provided by the University of Tokyo's Graduate School of Engineering. This provides information about examination subjects, schedules, and other related materials.

1 Entrance Examination

(1) Examination Subjects and Schedules

Date	Examination Subject(s) & Times			Notes
August 26 (Mon)	9:00~11:30 English (TOEFL ITP) [1]	13:00~15:30 Mathematical Problems Designed to Test Ability to Think Logically [2]	16:30~18:00 Reading Comprehension	Examinations for All Master's Course Applicants
August 27 (Tue)	9:00~ Oral Examination			

[1] Applicants can submit an official TOEFL PBT or TOEFL iBT score at the time of application in lieu of taking the English (TOEFL ITP) Examination. Please refer to the Notice regarding Foreign-language (English) Examinations in 2020 (Master's Program), provided by the University of Tokyo's Graduate School of Engineering.
Note: If an official score is submitted, the TOEFL ITP examination cannot be taken.

[2] Some of the problems included in Mathematical Problems Designed to Test Ability to Think Logically will be the same as the problems from the Regular Education Subjects Mathematics Examination provided by the Graduate School of Engineering. Past Regular Education Subjects problems are available on the following website:
http://www.t.u-tokyo.ac.jp/soee/admission/general_past.html

(2) Examination Locations

a) Written Examination
Information about the location will be posted on the School of Engineering bulletin board at the entrance of Engineering Building 8 and the Department of Systems Innovation bulletin board on the second floor of Engineering Building 3 on August 23 (Fri). The information will also be posted on the Department of Systems Innovation website.

b) Oral Examination
Information about the location and the timetable will be posted on the Department of Systems Innovation bulletin board on the second floor of Engineering Building 3 after the Reading Comprehension Examination on August 26 (Mon).

(3) Notes

a) All written and oral examinations must be taken.
b) For the written examination, applicants should be in the examination room 15 minutes before the start time.
c) Applicants are not allowed to use materials other than black pencils (or black mechanical pencils), an eraser, a pencil sharpener (desktop types are not allowed), and a watch (watches may have time measurement functions only).

2 Declaration of Preferred Supervisors

Please refer to the list of faculty members and outlines of their research (available on pages 8 - 10), and fill out the Declaration of Preferred Supervisors document on page 3 and submit it to the Department of Systems Innovation Office (Eng. Building 3, 2nd floor, Room 225) by July 26 (Fri). Caution: the submission deadline and location are different from those for entrance examination application documents.

3 Other

(1) Enrollment in September 2019

Successful applicants can enroll in the master's program in September 2019. If you would like detailed information about the requirements, please read the Guidelines for Applicants to the 2020 Master's Program, provided by the University of Tokyo's Graduate School of Engineering. If you will meet the requirements for eligibility between September 20 and September 30, 2019 and wish to enroll in September, please contact the following desk before you apply:

Graduate School Team, Administrative Division, School of Engineering, the University of Tokyo
7-3-1, Hongo, Bunkyo-ku, Tokyo 113-8656, Japan
Tel: +81-3-5841-6038, +81-3-5841-7747

(2) Other Details

If you have any further questions, please contact the Department of Systems Innovation Office:

TEL: +81-3-5841-6533, +81-3-5841-2900 (English-speaking staff)
URL: http://www.sys.t.u-tokyo.ac.jp

Declaration of Preferred Supervisors

(Master's Program, Department of Systems Innovation)

Please fill out the form and submit it (in person or via mail) to the Department of Systems Innovation Office (Eng. Building 3, 2nd floor, Room 225). It must be received no later than July 26 (Fri), 2019.

Name	
University (undergraduate)	
Faculty	
Contact Address	Postal code: Address: Tel:
Mobile phone: (For emergency contact)	
Email:	

(1) Referring to the list of faculty members on pages 8 - 10, please fill out the form below with supervisors' numbers (in order of preference).

(2) You can choose up to ten potential supervisors, but do not necessarily need to fill in the form completely. If space is left blank, it will be considered an indication that you do not wish to identify preferred supervisors.

(3) This process aims to match students with their first choice supervisor. However, because each supervisor can accept a limited number of students, it is possible you will not be assigned to your first choice.

(4) If you are assigned to a supervisor not included on your preferred supervisor list, will you accept the placement? Please check one of the boxes below.

☐ Yes, I will accept the placement.
☐ No. I will not accept the placement and will decline admission.

Order of Preference	1	2	3	4	5	6	7	8	9	10
Supervisor No.										

2020 Doctoral Program

This document contains important information regarding entrance examinations at the Department of Systems Innovation and is a supplement to the Guidelines for Applicants to the 2020 Doctoral Program, provided by the University of Tokyo's Graduate School of Engineering. This provides information about examination subjects, schedules, and other related materials.

1 Primary Examination

(1) Examination Subjects and Schedules

Date	Examination Subject(s) & Times			Notes
August 26 (Mon)	9:00~11:30 English (TOEFL ITP)	13:00~15:30 Mathematical Problems Designed to Test Ability to Think Logically	16:30~18:00 Reading Comprehension	Refer to notes 1, 2, 3, and 4 for the examinations described on the left.
August 28 (Wed)	9:00~ Oral Examination			Examinations for all Doctoral Course Applicants

(1) Applicants can submit an official TOEFL PBT or TOEFL iBT score at the time of application in lieu of taking the English (TOEFL ITP) examination. Please refer to the Notice regarding Foreign-language (English) Examinations in 2020 (Doctoral Program), provide by the University of Tokyo's Graduate School of Engineering.
Note: If an official score is submitted, the TOEFL ITP examination cannot be taken.

(2) Some of the problems included in Mathematical Problems Designed to Test Ability to Think Logically will be the same as the problems from the Regular Education Subjects Mathematics Examination provided by the Graduate School of Engineering. Past Regular Education Subjects problems are available on the following website.
http://www.t.u-tokyo.ac.jp/soee/admission/general_past.html

(3) Applicants who have completed or are expected to complete a master's program (or professional degree program) at the University of Tokyo do not need to take the English examination.

(4) Applicants who have completed or are expected to complete a master's program (or professional degree program) at one of the following graduate schools at the University of Tokyo do not need to take the English, Mathematical Problems Designed to Test Ability to Think Logically, and Reading Comprehension Examinations.

- Graduate School of Engineering
- Graduate School of Frontier Sciences
- Graduate School of Information Science and Technology
- Graduate School of Interdisciplinary Information Studies

(2) Examination Locations

a) Written Examination
Information about the location will be posted on the School of Engineering bulletin board at the entrance of Engineering Building 8 and the Department of Systems Innovation bulletin board on the second floor of Engineering Building 3 on August 23 (Fri). The information will also be posted on the Department of Systems Innovation website.

b) Oral Examination
Information about the location and the timetable will be posted on the Department of Systems Innovation bulletin board on the second floor of Engineering Building 3 on August 26 (Mon).

(3) Notes

a) For the written examination, applicants should be in the examination room 15 minutes before the start time.
b) Applicants are not allowed to use anything other than black pencils (or black mechanical pencils), an eraser, a pencil sharpener (desktop types are not allowed), and a watch (watches may have time measurement functions only).

(4) Oral Examination

a) Please explain your master's thesis research (or research achievement equivalent to a master's thesis), and your plans for your doctoral research. Your knowledge in your field of specialization, preparedness for doctoral work, and ability to conduct research will be evaluated.
b) Please prepare 20 sets of presentation handouts.
c) A projector will be available for use in the examination room.
d) Applicants who wish to enroll in September 2019 and who have completed, or are expected to complete a master's (or professional) program by September 30, 2019, do not need to take the secondary oral examination described below. Primary and secondary oral examinations will be combined.

2 Required Documents

Applicants must submit documents listed below to the Department of Systems Innovation Office by the designated due date. Applicants must also prepare the application documents listed in section seven of the Guidelines for Applicants to the 2020 Doctoral Program, provided by the University of Tokyo's Graduate School of Engineering. As you prepare these documents, please consult thoroughly with your preferred supervisor.

a) All applicants
Declaration of Preferred Supervisors (on page 7)
Submission deadline: July 19 (Fri), 2019
b) Applicants taking only primary examinations (primary oral examination)
① Summary of research to present (4 pages, A4; 1 copy)
② Doctoral dissertation plan (1 page, A4; 1 copy)
Submission deadline: August 16 (Fri), 2019
c) Applicants taking secondary examinations (combined primary and secondary oral examinations)
① Summary of research to present and doctoral dissertation plan (6 pages, A4; 1 copy)
② Copy of your master's thesis (or equivalent other document[s] illustrating research achievements) (1 copy)
③ List of research achievements (1 copy)
Submission deadline: August 16 (Fri), 2019

Note 1) All documents should be printed single-sided on A4 paper and should not be stapled.
Note 2) The list of research achievements should be categorized by type, such as: academic journal publication, review, expository paper, presentation, etc.

3 Secondary Examination

The secondary examination is an oral examination and will be administered to those who pass the primary examination (except applicants who meet the conditions described in 1-(4)-d). The examination will be scheduled between late January and mid-February, 2020. Details will be sent to applicants at a later date.

4 Other

a) The Department of Systems Innovation does not hold winter entrance examinations (Application Schedule B).

b) Successful applicants can enroll in the doctoral program in September 2019. If you would like detailed information about the requirements, please read the Guidelines for Applicants to the 2020 Doctoral Program, Graduate School of Engineering, the University of Tokyo. If you will meet the requirements for eligibility between September 20 and September 30, 2019 and wish to enroll in September, please contact the following desk before you apply:

   Graduate School Team, Administrative Division, School of Engineering, the University of Tokyo
   7-3-1, Hongo, Bunkyo-ku, Tokyo 113-8656, Japan
   Tel: +81-3-5841-6038, +81-3-5841-7747

c) If you have any further questions, please contact the Department of Systems Innovation Office:

   TEL: +81-3-5841-6533, +81-3-5841-2900 (English-speaking staff)
   URL: http://www.sys.t.u-tokyo.ac.jp

Declaration of Preferred Supervisors

(Doctoral Program, Application Schedule A, Department of Systems Innovation)

Please fill out the form and submit it (in person or via mail) to the Department of Systems Innovation Office (Eng. Building 3, 2nd floor, Room 225). It must be received no later than July 19 (Fri), 2019

Name	
University (undergraduate) (postgraduate)	
Contact Address	Postal code: Address: Tel:
Mobile phone:	
Email:	

Name of preferred supervisor

Faculty Members and Outlines of their Research (1/3)

Supervisor's No.	Name of Supervisor	Research field
1	Kazuhiro AOYAMA Prof. (Research into Artifacts, Center for Engineering)	System Architecture Design, Product Family and Product Platform Design, Product Lifecycle Management (PLM), Model-Based System Design (MBSD), Project Management. Product Service System (PSS), Service Design, Human Centered Manufacturing System, Industry 4.0, Knowledge Management.
2	Kiyoshi IZUMI Prof.	(1) Financial informatics: Artificial market simulation; Financial text mining; AI application in finance. (2) Engineering based economics: Consumer data analysis; Geo-tagged twitter data analysis; Marketing simulation. Those who want to join our laboratory should visit http://kinba.sakura.ne.jp.
3	Yukio OHSAWA Prof.	(1) Methods for discovering opportunities and risks from commercial, natural, and/or behavioral data, (2) Realizing cognition, thought, and decisions for innovating businesses in designed markets of data where strategies for combining/using/reusing data are communicated and created.
4	Yoji OKABE Prof. (Institute of Industrial Science)	Health diagnostics of advanced composite structures for airplanes and automobiles, Structural health monitoring systems, Non-destructive inspection techniques, Fiber-optic ultrasonic sensing systems for remote diagnosis, Internal damage detection using ultrasonic guided waves, Laser ultrasonics, Nonlinear ultrasonics, Acoustic emission.
5	Taira OKITA Assoc. Prof. (Research into Artifacts, Center for Engineering)	Multiscale simulations for crystalline materials (Molecular dynamics, Monte Carlo etc.), MD-FEM concurrent coupling model to clarify meso-scale phenomena of solid materials, Development of non-destructive evaluation techniques for detecting material degradation, Digital twin of artifacts by integrating inspection techniques and computational science
6	Yasuhiro KATO Prof. (Frontier Research Center for Energy and Resources)	Discovery of deep-sea mineral deposits and space resources for rare-earths and base/rare/precious metals, Decoding of global environmental changes and material cycles during the whole history of the Earth, Design of deep-sea and space resource development.
7	Tomoya KAWABATA Assoc. Prof.	Optimization of future supply system of liquefied natural gas and research of the reliability of transportation and storage of LNG, Nano-scale microstructural design for economic rationality based on fracture mechanisms using front-line technology, Optimum arrangement of material in building and civil engineering fields against huge earthquakes
8	Taro KANNO Assoc. Prof.	Cognitive Systems Engineering (Human-Centered Systems Design & Management): Team Cognition, Organizational Simulation, Cognitive Data Analysis, Human Factors in Medical, Nursing, ATC, and Emergency Response. Sociotechnical Systems Resilience.
9	Daisuke KITAZAWA Prof. (Institute of Industrial Science)	Marine Ecosystem Engineering. Ocean utilization in harmony with marine ecosystem. Energy, labor, and human saving of marine food production system. A hybrid ship using marine renewable energy. Environmental impact assessment of marine platforms. Water tank testing of flexible structures. Hydrodynamic and ecosystem coupled model.
10	Takashi GODA Assoc. Prof.	Numerical algorithms (e.g., Monte Carlo, quasi-Monte Carlo and multilevel Monte Carlo methods): from theory to engineering applications, Uncertainty quantification, Global sensitivity analysis, Decision making, Value of information analysis, Other related applied mathematics and statistics
11	Seiichi KOSHIZUKA Prof.	Particle method for fluid dynamics (accuracy, speed, multi-phase, snow), useful simulation for human beings (tsunami, flooding, collaboration with companies, mixing tank, composite, cavitation), physics-based computer graphics (visualization, real-time, position-based), credibility of simulation (V&V)
12	Hajime KOBAYASHI Assoc. Prof.	Biotechnologies for energy conversion, production and resource utilization. Technological applications of microbial symbioses to energy-related industries. Electromethanogenic conversion of CO_2. Energy-related environmental technologies (e.g. water treatment).
13	Kozo SATO Prof. (Frontier Research Center for Energy and Resources)	Sustainable Carbon Cycle (CCS, Geological Storage of CO_2 and Bio-conversion, Monitoring, Assessment of Environmental Impacts), Energy Resources Development and Uncertainty (Value of Information, Decision Making, EOR/IOR), Simulation for Unconventional Resources (Shale Gas, FDM･BEM･CIP･LBM･MD).
14	Ryuichi SHIBASAKI Assoc. Prof.	Global logistics network modelling and policy simulation: international, intermodal container cargo simulation, logistics analysis/modelling using the large-scale vessel movement database, and sequential modelling of international trade and logistics. Model applications to many kinds of logistics projects mainly planned for developing countries of the world
15	Kazuya SHIBATA Assoc. Prof.	Investigation of Phenomena and Optimization of Design by Numerical Simulation, Development of New Systems Using Physics-Based Simulation, Numerical Analysis of Fluid Force Acting on Ships and Offshore Structures, Tsunami Simulation in Coastal Areas, Engineering of Disaster Prevention and Mitigation, Development of Evaluation Method for Safety, Particle Methods.
16	Kazuki SHIBANUMA Assoc. Prof.	Structural integrity to achieve sustainable society: Investigation on fracture mechanics of materials and structures, Development of prediction method of aging degradations and maintenance theory, Innovative physical modeling to integrate multiscale
17	Takashi SHIMADA Assoc. Prof.	Statistical Physics and nonlinear science on biological, ecological, social and economic systems. Namely, ①Theoretical study of universal aspects, such as robustness, of open and evolving systems ②Simulation study of collective phenomena in biological, social, economic systems ③Data analysis of the dynamics of real complex systems.

Faculty Members and Outlines of their Research (2/3)

Supervisor's No.	Name of Supervisor	Research field
18	Katsuyuki SUZUKI Prof.	Structural mechanics, computational mechanics and optimal design of large scale structures, especially ship structure and ocean structures. Sports engineering and human dynamics and optimization of sporting goods and motion.
19	Hideyuki SUZUKI Prof.	Research on Ocean Renewable Energy development system for establishment of sustainable society, especially Floating Offshore Wind Turbine system. Research on floating systems for Ocean Resources, Energy and Space development, and related concept development, numerical model and validation, development of simulation method and risk analysis.
20	Jun TAKAHASHI Prof.	Thermoplastic CFRP for mass production automobile, LCA, Recycling, FEM simulation (structural optimization, crash safety, pedestrian safety).
21	Kenji TANAKA Assoc. Prof. (Department of Technology Management for Innovation)	(1) Systems Design for Transportation, Distribution, Energy, and Other Network Services, (2) Data analysis, Simulation, Forecasting, Risk evaluation for Systems Design.
22	Gjergj DODBIBA Assoc. Prof.	Resources processing and recovery; Physical and/or chemical processing of materials; Wastewater treatment; Soil remediation; Solid waste management; Environmental impact assessment;
23	Fujio TORIUMI Assoc. Prof.	Computational Social Science (Social Data Analysis, Agent-based Simulation) and AI for Society. Topics: Social Media, Web Services, Transportation Data, Medical Information, Complex Networks, Machine Learning, and Game Theory.
24	Kazunari NAKAJIMA Assoc. Prof. (Frontier Research Center for Energy and Resources)	In order to approach the energy and environmental problem from the view point of molecular science, we study catalysis technology. We aim to control the reactivity of catalysts and apply them as new devices or processes. Our main focus is experiments at lab (in collaboration with Prof. Yoshiaki Nishibayashi).
25	Kentaro NAKAMURA Assoc. Prof.	(1) Efficient methods for exploring deep-sea mineral resources, (2) Analytical methods for simple and precise determination of rare metals, (3) Formation processes and geological background of metal resources, (4) Evolution of Earth's surface environment and life.
26	Yoshiaki NISHIBAYASHI Prof.	Toward global innovations in renewable energy sources on the basis of catalysis technology, development of novel transformations (1) for use of ammonia as a new energy source and (2) for creation of energy and resources. Experimental chemistry to create new molecules by your hands.
27	Kimihiro HASHIBA Assoc. Prof.	Innovation in resource engineering: sophisticated mining system (rapid excavation, deep sea mining), risk reduction in resource development, long-term usage of underground structures (future forecast, long-term behavior), and geomechanical modeling/simulation.
28	Katsunori FUKUI Prof.	Systems Innovation Engineering of Resources Exploration and Development for Safe and Secure Society (Deep Sea Mining, Preservation of the Environment), Geospace Engineering, Rock Mechanics and Engineering (mechanical modeling/simulation), Mining Machinery.
29	Hideki FUJII Lecturer	Research and Development of Large-scale Multi-agent-based Traffic Simulation Utilizing High-performance Computing. Virtual Social Experiment. Simulation-based Understanding and Decision Support about Social Systems.
30	Kazuo FURUTA Prof. (Resilience Engineering Research Center)	Cognitive Systems Engineering, simulation of socio-technical systems based on human modeling. Resilience Engineering, institutional design and society design for realizing resilient society, technology development for assessing and enhancing resilience of critical infrastructure.
31	Yoshihiro MASUDA Prof.	Technology Innovation in Energy Resources Development: Methane Hydrates (New Gas Recovery Process with CO_2 Injection, Simulator Development), Application of Digital Oil Technology (Molecular Dynamics Simulation) to Gas Resource Assessment, and Enhanced Oil Recovery, etc.)
32	Hideaki MIYAMOTO Prof.	(1) Space resources based on planetary geology; (2) Planetary exploration (incld. Hayabusa-2 asteroid mission and MMX Mars satellite sample-return mission) and planetary data analysis; (3) Instrument development; (4) EPO activities at TeNQ space museum as a part of consensus building.
33	Shinsuke MURAKAMI Assoc. Prof.	Mineral Economics & Industrial Ecology (MFA/MSA): Sustainable Resource Use, Evaluation of Social Systems including legislative schemes for recycling of e-wastes and others containing precious/specialty metals, Environmental Impact Assessment of mining, Minerals Market Analysis (simulation / econometrics approaches)
34	Kazutaka YASUKAWA Lecturer (Frontier Research Center for Energy and Resources)	(1) Characterization of seafloor mineral resources based on high-precision chemical analyses, (2) Elucidating genesis of seafloor mineral resources by multivariate statistical techniques, (3) Clarification of Earth system's responses to climate changes based on statistical and modeling approaches. Targeting resources and environmental issues by understanding the Earth system.

Faculty Members and Outlines of their Research (3/3)

Supervisor's No.	Name of Supervisor	Research field
35	Tomonori YAMADA Assoc. Prof.	Large-scale Computational Mechanics Simulation for Safe Society, Multiphysics Simulation, High-performance Computing on Cutting Edge Supercomputers (K computer etc.) .
36	Shinobu YOSHIMURA Prof.	(1) High-performance Multiphysics Computational Mechanics Simulation and Its Application to Innovative Artifacts Design, (2) Resilient Design of Urban Traffic System Using Intelligent Multi-agent Simulator and Finance Theory, (3) R&D of Innovative Clean Energy Systems such as Off-shore Wind Farm and Coal Gasification Power Plant