

PROSPECTUS
FOR
THE DOCTORAL PROGRAM

Graduate School of System Informatics
KOBE UNIVERSITY

2nd Term, 2018

(Starting in October, 2018)

About Kobe University Graduate School of System Informatics

Graduate School of System Informatics, Kobe University was established in April 2010 when the Department of Computer Science and Systems Engineering was separated from the Graduate School of Engineering. Both the Master's Program and Doctoral Program of the Graduate School of System Informatics are organized in the following three departments: Systems Science, Information Science, and Computational Science.

A Doctor of Philosophy in System Informatics, a Doctor of Philosophy in Engineering, or a Doctor of Philosophy will be granted upon completion of the Doctoral Program of the Graduate School of System Informatics. Also, by completing the "Computational Science Intensive Course" offered by the Department of Computational Science, the student will be granted a Doctor of Philosophy in Computational Science.

Admission Policy of the Graduate School of System Informatics, Kobe University

The Graduate School of System Informatics develops and expands new disciplines aimed at the creation of new knowledge and value, with each of the department fields - Systems Science, Information Science, and Computational Science – as its pillars and system information (meaningful information that exists within a wide range of systems, from natural to engineering and social) at its core, promoting education and research for fostering human resources possessing high creativity and an international mindset who can make a positive contribution to society.

The Graduate School therefore actively accepts not only persons who have studied system technology, information technology, and computational technology in an engineering or information system undergraduate or graduate program, but also persons who have a high interest and desire to apply and expand the scope of these technologies in the various areas of specialization within the science, medical, cultural science, and social science fields.

In particular, the Graduate School largely welcomes persons who are equipped with high creativity, ingenuity, and logical thinking abilities, and who have a strong passion for exploring and further developing new "System Informatics". We also welcome students from the workforce who have research experiences and accomplishments at companies or research institutes.

(Admissions enquiries for the Doctoral Program of the Graduate School of System Informatics)

Student Affairs Section, Graduate School of Engineering, Kobe University

1-1, Rokkodai-cho, Nada-ku, Kobe 657-8501

Tel : 078-803-6350

e-mail: eng-kyomugakusei@office.kobe-u.ac.jp

Website of the Graduate School of System Informatics: <http://www.csi.kobe-u.ac.jp/>

Website of Kobe University: <http://www.kobe-u.ac.jp/>

Table of Contents

I The Doctoral Program of the Graduate School of System Informatics, General Admission Guidelines

1. Departments and Number of Students to be Accepted	1
2. Qualification for Applicants	1
3. Application Procedures	2
4. Screening Methods	3
5. Date and Place for the Interviews	4
6. Announcement of Successful Applicants	4
7. Admission Procedure	4
8. Eligibility Screening	5
9. Others	6
◎ Guide for overseas remittance of entrance examination fees	9
◎ Special Education System for Students Entering From Workplace	10

II Overview of the Doctoral Program of Graduate School of System Informatics

1. Philosophy and Features of Curriculum	11
2. Features of Doctoral Program Education.....	11
3. Departments and Divisions of the Graduate School of System Informatics.....	12
4. Education and Research Fields, Research Subjects, and Faculty Members.....	15

◎ Attached Forms (The Set of Required Application Forms)

- Application Form (Form No.1)
- Curriculum Vitae (Form No. 2)
- ID for the examination (Form No.3)
- Certificate of payment Card (Form No. 4)
- About the payment of entrance exam fee for application (Form No. 5)
- Summary of master's thesis and Research Progress Report (Form No. 6)
- Research proposal (Form No. 7)
- Self-addressed Forms (Form No. 8)

- Envelope (For sending the ID for the examination) (Form No. 9)
- Application Form for Examination of Qualification (Form No. 10)
- History of research (Form No. 11)
- Research experience (Form No. 12)

I The Doctoral Program of Graduate School of
System Informatics General Admission
Guidelines

Systems Science
Information Science
Computational Science

2018 October (2nd Term)
Graduate School of System Informatics, Kobe University, the Doctoral Program
Application Guidelines

1. Departments and the Number of Students to be Accepted

Department	No. of Students
Systems Science	A few
Information Science	A few
Computational Science	A few

(Note) The number of students to be accepted includes students who go on to a doctoral program from our master's programs, foreign students and students entering from the workforce.

2. Qualification for Applicants

Applicants must currently meet one of the following requirements or be eligible to meet one of these requirements by September 30, 2018.

- (1) Those who have obtained a master's degree or a professional degree.
- (2) Those who have obtained a degree equivalent to a master's degree or a professional degree in a foreign country.
- (3) Those living in Japan who have completed a correspondence course in a foreign-affiliated educational institution and obtained a degree equivalent to a master's degree.
- (4) Those who have completed their education in a foreign-affiliated university within a school educational system of a foreign country in Japan and designated by the Minister of Education, Culture, Sports, Science and Technology, limited to those who have obtained a degree equivalent to a master's degree or a professional degree.
- (5) Those who have been conferred a degree equivalent to a master's degree from the United Nations University which was promulgated by the General Assembly of the United Nations on December 11, 1972 and in accordance with the Agreement between Japan and the United Nations concerning the Act on Special Measures Incident to Enforcement of the Agreement between the United Nations and Japan regarding the Headquarters of the United Nations University (1976, Resolution 72, Article 1, Item2)
- (6) Those who have completed the curricula at a foreign university, an educational institution which is designated under Item 4, or the United Nations University and are recognized as having academic abilities equivalent or superior to those given a master's degree by passing the examination and screening which are equivalent to the ones stipulated in Article 16, paragraph (2) of the Standards for Establishment of Graduate Schools (under Ministry of Education, Culture, Sports, Science and Technology Ordinance No. 28, 1974).
- (7) Those who are approved by the Minister of Education, Culture, Sports, Science and Technology (under Minister of Education, Culture, Sports, Science and Technology Public Notice No. 118, 1989).
- (8) Those who are 24 years of age or older and are recognized by Eligibility Screening as having academic abilities equivalent or superior to those given a master's degree or a professional degree.

【Note】 Those who intend to apply under the requirement (7) or (8) above should refer to “8. Eligibility Screening” because they are subject to screening prior to their applications

3. Application Procedures

- (1) Period of application and how to submit the application
From January 5 (Fri) 2018 to January 10 (Wed) 2018 (except Saturday & Sunday)
When you submit in person, the office hours are Monday through Friday, from 9:00 to 12:00 & 13:00-17:00.
If you submit by mail, your application documents must arrive no later than 17:00, **January 10 (Wed) 2018**. On the envelope, write “Application Documents for the Doctoral Program” in red and mail it by “express registered mail”.
- (2) Mailing Address:
Kobe University Graduate School of Engineering, Students Affairs Section
1-1, Rokkodai-cho, Nada-ku, Kobe 657-8501
Tel (078) 803-6350 (direct)
- (3) Application documents
 - (A) Application form: Form designated by the Graduate School of System Informatics (Form No.1)
 - (B) ID for the examination (Form No. 3) and Certificate of payment Card (Form No. 4)
 - (C) Photograph: Affix two copies of photograph to the designated places on the application form and the ID for the examination.
The photograph should be 4 cm long and 3 cm wide and of upper body, taken within three months prior to submitting the application; in the picture, you should be looking straight ahead with your head uncovered.
 - (D) Curriculum Vitae: Form designated by the Graduate School of System Informatics (Form No.2)
 - (E) Certificate of (Prospective) Graduation of a master’s degree program of graduate school (master’s course). If the Graduation Certificate indicated above does not show the degree you obtained, please submit a certificate of degree as well.
 - (F) Academic transcript (1): Academic performance record created by the head of faculty or the principal of the university you graduated from
 - (G) Academic transcript (2): Academic performance record created by the head of department or the principal of the graduate school you graduated from
 - (H) Entrance exam fee: ¥30,000
Bring the attached form of JP bank (Form No. 5) and deposit the fee from the bank; make sure to affix the proof of receipt of postal transfer for entrance exam fee to the mounting card and send it together with the application documents. (When paying from overseas, please refer to the “Guide for overseas remittance of entrance examination fees” on page 9.) Japanese government-sponsored international students who will continue to be so after enrollment do not have to pay the fee on condition that they submit the “Certificate of Japanese Government-sponsored International Student” from the university you are currently enrolled (unless you are a student of Kobe University).
 - (I) Master’s thesis:
 - (a) Applicants who have completed a master’s degree program (master’s course)
 - i) A copy of your master’s thesis written either in Japanese or in English. If not available, please contact the Student Affairs Section of Graduate School of Engineering in advance and follow the instructions you will be provided.
 - ii) Summary of master’s thesis (A4): A set of copies of the outline written in both Japanese (approx. 2,000 words) and English (approx. 1,200 words), with a cover sheet designated by the Graduate School of System Informatics (Form No. 6). For foreign applicants, an English copy alone is sufficient.
 - (b) Applicants who are expected to complete a master’s degree program (master’s course) or succeeded in eligibility screening

Research Progress Report (A4): A set of copies of the report written in both Japanese (approx. 2,000 words) and English (approx. 1,200 words), with a cover sheet designated by the Graduate School of System Informatics (Form No. 6). For foreign applicants, an English copy alone is sufficient.

* Any reference material may be submitted along with either (a) or (b).

(J) Research proposal:

(All applicants except successful applicants of eligibility screening)

A copy of A4 report written in Japanese (approx. 2,000 words) or English (approx. 1,200 words) with a cover sheet designated by the Graduate School of System Informatics (Form No. 7) indicating the details of your intended research and field.

(K) Resident Certificate: Foreign applicants should submit a Copy of Resident Certificate which is issued by the local municipality (valid for 30 days from issue date), or a document that can take the place of the Resident Certificate. (Only for those residing in Japan)

(L) Self-addressed Forms: Write your postal code, address, and name in the form designated by the Graduate School of System Informatics (Form No.8).

(M) Envelope:

(All applicants except those who live abroad)

Write your postal code, home address and name on the envelope designated by the Graduate School of Engineering and attach 372 yen stamps (Form No.9).

[Note]

- (1) No changes are allowed in the application documents once they have been received. The entrance exam fee will not be returned to an applicant except in cases where the applicant did not apply or the application was not accepted.
- (2) Make sure that documents created in a foreign language other than English are accompanied by a Japanese translation with the translation accreditation issued by a public institution such as the diplomatic facilities of Japanese or foreign governments. However in the case of submitting documents issued by Chinese universities, please ensure that a Credentials Reports is sent by mail to the Student Affairs Section, Graduate School of Engineering, Kobe University (Registration Code: W600501) through CDGDC (China Academic Degrees & Graduate Education Development Center) by the deadline for applications. For China, the documents which are obtained and submitted by applicants themselves are not accepted in principle. You need to send the documents issued by your university to CDGDC and pay the fee. Please make sure to have the Credentials Reports issued in English. For more details, please refer to the website (<http://www.cdgdc.edu.cn>).
- (3) Applicants should select a desired faculty member from the “Education and Research Fields, Research Subjects, and Faculty Members” and indicate his/her name in the admission application form. Without the desired faculty member’s name, the application documents will not be accepted. Also, **applicants should closely contact the expected academic supervisor and create a research proposal.**
- (4) For those who submit a certificate of prospective graduation, please submit a certificate of graduation when you enroll. If the certificate does not show the degree you obtain, please submit a certificate of degree as well.

4. Screening Methods

Admission will be determined based on the results of academic examination together with the submitted documents.

The academic examination will consist of an oral examination and interview.

(1) Content of a master’s thesis or research progress report

Examined as to whether or not the applicant has basic academic skills required for the course.

(2) English capability (for applicants graduated from a foreign university, both English and Japanese language skills are examined)

Examined as to whether or not the applicant has language skills required for the course.

(3) Content of research proposal

Examined as to whether or not the research plan meets the doctoral degree to be awarded.

5. Date and Place for the Interviews

Date	Place	Remark
February 1, 2018 (Thu)	Faculty of Engineering Building, Kobe University	Applicants will be notified of time and place for the interview at a later date.

【Access to Kobe University Faculty of Engineering Building】

Hanshin “Mikage” station, JR “Rokkomichi” station, or Hankyu “Rokko” station.

Kobe Municipal Bus No. 16 (bound for Rokko Cable)

Shindai Kokusai Bunka Gakubu Mae, 5 min on foot to the Rokkodai Campus

For those who have difficulty in meeting at the indicated date and place above for special reasons, a remote interview might be permitted and provided through the internet. If you wish for a remote interview, you must apply to the expected academic supervisor at the time of submitting the application form.

6. Announcement of Successful Applicants

February 13, 2018 (Tuesday) 10:00 (scheduled)

The results will be announced both on the bulletin board and via the website of the Graduate School of System Informatics, Kobe University.

<http://www.office.kobe-u.ac.jp/eng-ofc/kym/csi/jyuken.html>

※Successful applicants will receive the acceptance letter. Inquiries will not be accepted via telephone.

7. Admission Procedure

(1) Admission procedure period and admission documents

The admission procedure period is scheduled to be around mid September 2018. The details will be mailed to each successful applicant in late September 2018 with necessary documents for the procedure.

(2) Fees

Division		In Japanese yen	Remark
Admission fee		282,000	Admission fee should be paid during the admission procedure period.
Tuition fee	For semester	267,900	Refer to the “General Information for Successful Applicants” which will be sent in late September 2018. [In case the tuition is revised, the new fee is applied from the time of the revision.]
	Annual total	535,800	

(Note) The amounts quoted above apply to 2017.

[Note]

(1) The admission of applicants who fall under the following items may be revoked.

(A) Applicants who made a false declaration

- (B) Applicants who did not meet the qualification requirements
- (2) The admission fee already paid will not be returned for any reason.
- (3) Admission fee and tuition fee are not required for Japanese government-sponsored international students who will continue to be so after enrollment.

8. Eligibility Screening

Those who intend to apply under the requirements “2. Eligibility Screening (7) or (8)” will be screened by the following documents submitted.

- (1) Documents necessary for screening
 - (A) Application Form for Examination of Qualification: the application form designated by the Graduate School of System Informatics (Form No. 10)
 - (B) Graduation certificate created by the head of faculty or the principal of the university you graduated from.
 - (C) Curriculum Vitae: the form designated by the Graduate School of System Informatics (Form No. 2).
 - (D) History of research: created by immediate manager or representative of education/research institute or company where the research was conducted. If such a certification is unavailable, an application written by the applicant can substitute it. Use the form designated by the Graduate School of System Informatics (Form No. 11).
 - (E) Research experience (A4): the outline of a thesis that is “an equivalent of master’s thesis”. A set of copies written in both Japanese (approx. 2,000 words) and English (approx. 1,200 words), with a cover sheet designated by the Graduate School of System Informatics (Form No. 12). For foreign applicants, an English copy alone is sufficient.
 - (F) Materials of research achievements: Index of thesis and separate print (photocopy acceptable), which are the basis of the research achievements, along with references of other achievements, if any. In case of collaborative research, attach the material clearly indicating the portion the applicant was in charge.
 - (G) Research proposal (A4): a copy of a report indicating the field and research the applicant would like to explore, written either in Japanese (approx. 2,000 words) or English (1, 200 words) with a cover sheet designated by the Graduate School of System Informatics (Form No. 7).
 - (H) A self-addressed envelope (23.5cm long × 12cm wide with a 362 yen stamp)

Note that those who have completed a 6-year course of medical college, dental college, or veterinary medicine are not required to submit the abovementioned (D), (E) and (F).

(2) Period and place for submission

Your application documents must be submitted in person or mailed (simple registered mail marked “Application Form for Examination of Qualification for the Doctoral Program of Graduate School of System Informatics” in red on the envelope) by Friday, October 13, 2017, to the Student Affairs Section, Graduate School of Engineering, Kobe University.

Office hours (for those who hand in): Monday through Friday: 9:00-12:00 & 13:00-16:00

(3) Announcement of the screening results

Successful applicants will be notified of the result by Friday October 27, 2017.

9. Others

1. Admission Fee Payment Exemption

Applicants recognized as having extreme difficulties in making the payment of the admission fee who fall under any of the following categories and make the relevant application may be exempted from the payment of all or half the admission fee upon screening (low income does not automatically qualify applicants for the exemption).

- (1) The person mainly responsible for paying school expenses for the applicant having passed away within the year prior to admission.
- (2) The applicant or the person mainly responsible for paying school expenses for the applicant having suffered from flood or storm damage within the year prior to admission.
- (3) The applicant having a reason equivalent to either of the above-mentioned that is recognized by the University.

2. Admission Fee Payment Deferral

Applicants who fall under any of the following categories and make the relevant application may be able to defer payment of the admission fee for a certain period upon screening (subject to confirmation by Kobe University).

- (1) Applicants, for whom payment by the payment deadline has become difficult due to financial reasons, and who are recognized as having excellent academic records.
- (2) Applicants for whom payment by the payment deadline has become difficult because the person mainly responsible for paying school expenses for the applicant has passed away within the year prior to admission.
- (3) Applicants for whom payment by the payment deadline has become difficult because the applicant or the person mainly responsible for paying school expenses for the applicant has suffered from flood or storm damage within the year prior to admission.
- (4) Applicants for whom payment by the payment deadline has become difficult due to unavoidable circumstances other than indicated above.

3. Tuition Fee Payment Exemption

Applicants who fall under any of the following items and make the relevant application may be exempted from the payment of all or half of the tuition fee upon screening.

- (1) Applicants recognized as having difficulty in making the payment due to financial reasons and having excellent academic records.
- (2) Applicants, except those who fall under (1), recognized as having extreme difficulty making the payment due to any of the following circumstances.
 - i The person mainly responsible for paying school expenses for the applicant having passed away within a year prior to admission (when concerning the exemption of tuition fee of the term of the admission).
 - ii The applicant or the person mainly responsible for paying school expenses for the applicant having suffered from flood or storm damage within a year prior to admission (when concerning the exemption of tuition fee of the term of the admission).
 - iii The applicant having a reason equivalent to either of the above-mentioned that is recognized by the University.

4. Handling of personal information

- (1) Kobe University complies with the legislation such as “Act on the Protection of Personal Information Held by Independent Administrative Legal Entity” in using the personal information on applicants, and handles it based on the “Guideline on the Control of Personal Information Held by Kobe University”.

- (2) Personal information including the individual results of screening shall be used for screening (application procedures, conducting screening), announcement of successful applicants, enrollment procedures, and materials for reviewing the screening methods for the future.
- (3) Personal information of enrolled students provided for the application will be used for supporting the students after enrollment (health management, tuition fee exemption or scholarship application, etc), educational purposes such as academic instruction, tuition-fee related affairs, and other corresponding work.
- (4) Part of the operations may be outsourced to an agency. (Hereafter called “Agency”). In the case of outsourcing the operations, all or part of the personal information provided will be provided to such an Agency with nondisclosure obligation within a certain limit necessary for the Agency to execute the operations.

5. Preventive Measures against Measles and Rubella

Regarding submission of the “Immunization Certificate” of measles and rubella vaccines (or combination vaccine of both measles and rubella vaccines such as MR vaccine), or “Antibody Test Certificate” of measles and rubella.

To prevent a possible outbreak of measles and rubella on campus after enrollment, Kobe University requires all students to submit either one of the following certificates. Students entering in April must submit either one of them at the routine medical check-up for new students scheduled in early April, while students entering in October must do so at the routine medical check-up scheduled in October

- ① Vaccination Certificate given to students who were inoculated with measles and rubella vaccines, twice for each. (Immunization Certificate)
- ② Vaccination Certificate given to students who were inoculated with measles and rubella vaccines once for each within the last five years (Immunization Certificate)
- ③ A document given to students who display adequate antibody titer in their blood to prevent developing measles or rubella within the last five years (refer to the following table). (Antibody Test Certificate)

If the antibody titer level is below the requirement yet you cannot be inoculated with the vaccine for any reason such as illness or constitution, please present a document explaining why (for example, a certificate issued by the doctor).

- * “Vaccination Certificate” refers to a document issued by an accredited medical institute that states the type of vaccine used and the date of inoculation.
- * The MR vaccine (a combination vaccine of both measles and rubella) suffices for the vaccines of ① and ②.
- * “Antibody Test Certificate” is a document issued by an accredited medical institute showing the measurement methods and values for the antibody titer in the blood specified in the below table, and the measurement values meeting the “protective antibody titer values”.
- * The combination of the documents ①, ②, and ③—for example, the combination of “Vaccination Certificate” for measles(①) and “Antibody Test Certificate” for rubella (③)—is accepted.

The maternity passbook in which the type of vaccines and the date of inoculation are specified can be used as documents for ① or ②. If it only indicates the past medical history (the record of suffering the diseases) without the test results (a proof of the

diagnosis), submit either “Antibody Test Certificate” (③), or “Vaccination Certificate” (① or ②) after the inoculation.

* “Vaccination Certificate”, “Antibody Test Certificate”, and “A document issued by the doctor stating you cannot be inoculated with the vaccines for reason such as illness or constitution” will not affect the admission decision of screening.

Methods and Judgment Standard for Values of Protective Antibody Titer in Blood that Prevents Measles and Rubella

Division	Measurement Method	Judgment Standard	Remark
Measles	IgG – EIA	8.0 and above, positive	Has to show positive in one of the three measurement methods
	PA	128 and above, positive	
	NT	4 and above, positive	
Rubella	IgG – EIA	8.0 and above, positive	Has to show positive in one of the two measurement methods
	HI	32 and above, positive	

Please use the methods indicated above to judge the titer in the blood for measles and rubella. The protective antibody value differs according to the measuring method. Also, note that the values are higher than the values considered as simply positive. If your antibody titer level is below these values, please take the required vaccination and submit a “Vaccination Certificate”.

When you go to the medical institute, please show this vaccination notification to the doctor and receive required certificates (in particular, the measurement methods and judgment standards for the antibody test).

For further information concerning the infection-control measures, contact
 Medical Center for Student Health, Kobe University TEL: 078-803-5245
 Student Affairs Division, Kobe University TEL: 078-803-5219

* If you have any questions concerning the application, please contact us below.

Students Affairs Section ,
 Graduate School of Engineering,
 Kobe University,
 1-1 Rokkodai-cho, Nada-ku, Kobe 657-8501
 TEL (078) 803-6350
 e-mail: eng-kyomugakusei@office.kobe-u.ac.jp

“Guide for overseas remittance of entrance examination fees for the 2018 Doctoral Programs at the Graduate School of System Informatics, Kobe University”

The entrance examination fee is 30,000 Japanese yen. When paying from overseas, please be sure to make the payment in Japanese yen and remit 30,000 yen as the examination fee to the designated bank account mentioned below.

The remittance fees will be borne by the applicant, while Kobe University covers any other commissions including lifting charges or handling fees. No overseas remittance checks will be accepted.

A photocopy of the remittance request form must be attached to your application for admission.

Bank name	Sumitomo Mitsui Banking Corporation
Bank code	0009
Swift Code	SMBCJPJT
Branch	Rokko
Branch Code	421
Account No.	4142727
Recipient	Kobe University

In addition, please include the following information, if necessary.

Purpose of Remittance: Entrance Examination Fee

Message to Payee, if any: Please indicate "D63 : Applicant's full name"

* Please put "D63" before your name.

©Special Education System for Students Entering From Workplace

Recently, increasing numbers of engineers and researchers in the workforce wish to continue education and training as well as obtaining doctoral degrees in graduate school. However, education programs of graduate schools usually require them to spend time away from their workplace to focus on the graduate program for three years, which is likely to limit their learning opportunities. On the other hand, the "Graduate School Foundation Standard, Article 14" stipulates that "When special educational measures are recognized as necessary in the programs of the Graduate School, appropriate educational measures can be taken such as providing classes or research guidance during night or certain periods." considering the students from the workplace. Based on these backgrounds, the Doctoral Program of the Graduate School of System Informatics has implemented special educational measures as stipulated by the statement.

The following items summarize the program.

1. Part of class by a faculty member upon an agreement of the member, and part of research guidance by academic supervisor upon an agreement of the supervisor, can be provided during night or a certain period.
2. If the academic supervisor recognizes that the thesis is making good progress, and that superior facilities or equipment for the research are provided in the relevant company where outstanding performance can be expected, the student can conduct research within the company.

II Overview of the Doctoral Program of the Graduate School of System Informatics

1. Philosophy and Features of Curriculum

Our Doctoral Program promotes education and research for fostering researchers, higher education and research facility faculty members, and skilled professionals with advanced independent research skills, high creativity, and an international mindset for identifying, exploring and resolving problems. To this end, the program establishes rigorous courses related to the student's doctoral thesis, providing guidance in relation to investigational research, identifying problems, research planning, research implementation, research results organization, and methods for solving unresolved issues. The program also introduces a system of professional courses taught by multiple faculty members as well as cross-graduate-school courses, thereby fostering human resources equipped with advanced expertise and a broad perspective.

In an effort to aid our students in establishing careers as researchers specializing in computation science, we have established a "Computational Science Intensive Course" which provides the students with a cohesive education from the Masters Program through the Doctoral Program.

Unlike a general course where the student completes the masters program and then enters the doctoral program, our intensive course is designed with the objective of the students obtaining a doctoral degree from the start. Based on a curriculum that integrates various fields of education through collaboration with universities nationwide and short-term, intensive seminars, the course fosters human resources equipped with practical ability related to high-speed computation as well as highly professional knowledge and skills related to the fields of computational science.

The following explains the features of the curriculum we offer at the Doctor's Degree Program of the Graduate School of System Informatics.

2. Features of Doctoral Program Education

Introduction of Cross-Graduate-School Courses

We strive to foster interdisciplinary perspectives by offering students "Advanced Study on Advanced Integrated Science II", the cross-graduate-school course of five Graduate Schools of Kobe University (Science, Engineering, Agriculture, Marine, and System Informatics).

Students from Workforce (Complying with the Graduate School Establishment Standard Article 14: Special Case)

We are willing to accept students from the workforce in the Doctoral Program with an aim to fostering engineers equipped with a variety of highly advanced professional skills in System Informatics. To help such students learn while at work, we provide a system complying with the "Special Case of Education Based on School Establishment Standard, Article 14".

Establishment of Computational Science Intensive Course

In the Department of Computational Science of the Graduate School of System Informatics, we have established the "Computational Science Intensive Course" in the doctoral course, which is a cohesive education program covering a Master's Program and Doctoral Program. The curriculum in the Computational Science Intensive Course consists of subjects that enable students to obtain advanced knowledge and capability covering a wide range of expertise concerning high-speed computation and other computational science fields. To enhance the curriculum, we offer course subjects in collaboration with other departments and universities as follows.

Collaboration with Universities Nationwide

Computational Science involves extremely interdisciplinary education and research disciplines, which include various sciences and technologies such as the next-generation super computing technology as its basis. To provide systematic and specialized education covering broad subjects involving the computational science fields, it is essential to establish an educational system where the leading researchers in relevant fields belonging to other departments of Kobe University or other universities in Japan can provide the disciplines. To realize this, we have jointly established an education system nationwide in collaboration with other universities, which enables us to provide a curriculum that integrates a variety of educational fields, and foster human resources specialized in computational science.

Short-term Intensive Seminars

As a part of the official curriculum, we provide short-term intensive seminars for practical education which focuses on practical learning utilizing the super-computer. This aims to strengthen the practical capabilities in computational science such as advanced parallel programming technology, large-scale simulation technology, and

visualization of computational results technology.

Measures Taken for New Students Enrolled from the Doctoral Program

We provide course guidance at the time of enrollment to explain the basic philosophy of the curriculum, and the organization of the courses, so students can fully be aware of the requirements necessary for course completion. In particular, students who do not have a Master's Degree in System Informatics are instructed to enroll in some courses in the Masters Program if considered necessary, depending on the kind of master's degree and the background of the student. As the courses of the doctoral program are closely related to the research subjects given in each education and research field, students are advised to mainly enroll in advanced studies offered by multiple faculty members in the student's affiliated course. Students in the Computation Science Intensive Course in the Computational Science Department are encouraged to enroll in the advanced courses offered by the collaborative course, depending on their chosen research subject.

Doctoral Degree Accreditation Process

Research progress presentations are conducted for research concept, research progress, and future research plan during both the 1st year and 2nd year to instruct the students to create an appropriate doctor's thesis. In the 3rd year, the research result presentation is conducted, and if the research results are acknowledged as superior, the student can proceed to submitting the doctoral thesis and reviewing (including the doctoral thesis presentation). All departments make a concerted effort in conducting research progress presentations, research results presentations, and the doctoral thesis presentation so that each department, or the Graduate School of System Informatics when necessary, can be involved in guiding the students' research. For those who finish early, the research result presentation and the doctoral thesis presentation are conducted during the 1st or the 2nd year.

3. Departments and Divisions of the Graduate School of System Informatics

The Graduate School of System Informatics consists of three departments: Systems Science, Information Science, and Computational Science.

(1) Systems Science

The Department of Systems Science provides the student with the interdisciplinary education and research on theories and technologies required for system analysis, design, configuration and operation. Thus, in the Masters Program, the department provides the student with the theory of systems approach methodology and problem-solving skills for effectively practicing analysis and synthesis. The department aims to foster human resources with high creativity and an interdisciplinary perspective. In the Doctoral Program, the student will deepen their knowledge about specialized fields; in this program, we aim to foster researchers with advanced skills capable of creating new theories and technologies to integrate different fields.

To this end, the Department of Systems Science consists of the following three divisions as its pillars: Fundamentals of Systems Science, Innovations of Systems Science, and Applied Robot Science.

Fundamentals of Systems Science

The Division of Fundamentals of Systems Science provides the student with an education and research experience in the theoretical basics and methodologies for system analysis, design, construction, and operation. The division includes four research groups: Systems Planning, Optimum System Design, Applied Optics, and Systems Control.

Innovation of Systems Science

The Division of Innovation of Systems Science provides the student with an education and research experience in methodologies and techniques related to the realization of systems having near human intelligence, and system theories for intelligent system design. The division has three research groups: Mathematical System Analysis, System Analysis, and Intelligent Systems.

Applied Systems Science

The Division of Applied Systems Science provides the student with an education and research experience in system application methodologies and techniques, with a focus on the applicable aspects of system science and engineering theories and methodologies. This division targets the construction theories of sensor information systems for recognizing system environments, theories of recognition and understanding of a three-dimensional world, rational planning and control theories for systems, and theories of system application methodology and techniques for FA systems and industrial robots.

(2) Information Science

The Department of Information Science provides the student with education and research on establishing mathematical information infrastructure theories, exploring new methodologies for information processing, and developing cutting-edge information application techniques. Thus, in the Masters Program, we aim to foster human resources with a broad perspective and the capability of taking leadership roles in wide scopes of discipline—from basic theories in relation to information science that contributes to developing, processing, and utilizing valuable information, to the social application thereof. In the Doctoral Program, we aim to foster researchers equipped with advanced problem-identifying, exploring, and solving capabilities as well as high creativity in these academic fields.

To this end, the Department of Information Science consists of the following three divisions as its educational pillars: Foundation of Information Sciences, Intelligent Informatics, and Kansei and Media Art.

Foundation of Information Sciences

The Division of Foundation of Information Sciences provides the student with an education and research experience in mathematical information infrastructure theories, and elementary technologies for information processing. The division has four research groups: Mathematical Logic and Statistics, Processor Architecture, Software Science and Telecommunications.

Intelligent Informatics

The Division of Intelligent Informatics provides the student with an education and research experience in methodologies and algorithms for information expression, acquisition, processing, and applications thereof. The division provides the following four research groups: Integrated Information Systems, Knowledge and Information Processing, Media Informatics, and Emergent Computing.

Kansei and Media Art

Research and development of Kansei and media art systems focuses on display and actuation technologies that allow precise information transmission through multiple I/O methods upon understanding the circumstances. Our lecture mainly covers advanced technologies on human robot interaction, voice interaction, and haptic interaction.

(3) Computational Science

The Department of Computational Science provides the student with an education and research experience in technical foundation of high-speed computation and understanding and solving the natural events based on a computational approach and the application thereof. Thus, in the Masters Program, we aim to foster human resources equipped with broader knowledge and high creativity in the fields of massively parallel computation and algorithm, and the application thereof. In the Doctoral Program, we aim to foster researchers who excel in capability of creating new theories and techniques related to high-speed computation; and exploring, developing, and practicing innovative science and technology taking advantage thereof.

To this end, the Department of Computational Science consists of the following five divisions as its educational pillars: Fundamentals of Computational Science, Innovation of Computational Science, Applied Computational Science and Large Scale Computational science.

Fundamentals of Computational Science

The Division of Fundamentals of Computational Science provides the student with an education and research experience in mathematical methodologies and massively parallel information processing, which serve as the fundamentals of computational science. The division includes the following four research groups: Basics of Computational Science, Computational Intelligence, Computational Fluid Dynamics and Simulation Techniques.

Innovation of Computational Science

The Division of Innovation of Computational Science provides the student with an education and research experience in computational science and computational engineering, which serve as new scientific methodologies in the science and engineering field.

The division includes the following four research groups: Computational Molecular Engineering, Computational Biology, Computational Robotics, and Computational Space Science and Engineering

Applied Computational Science

The Division of Applied Computational Science provides the student with an education and research experience based on large-scale, practical subjects such as the physical process of climatologic and meteorological fluid system simulation and algorithms, predictions and actual results based on the incorporation thereof, and discrete system simulation for the substances that form the Earth's crust.

Large Scale Computational Science

The large scale computational science research group educates concerning various advanced computational research fields from the system software for computer science to complex phenomena unified solution research. This division aims to teach large scale computational science using super-computers like the K computer at the RIKEN Advanced Institute for Computational Science.

4. Education and Research Fields, Research Subjects, and Faculty Members

(1) Department of Systems Science

As of November 1, 2017

Divisions	Number	Education/Research Fields	Research Topics	Staff
Fundamentals of Systems Science	S-1	Systems Planning	Operational Research, Production Systems Engineering, Social Systems Engineering, Optimisation, Multi-Agent System, Management Engineering, Decision Support Theory, Service Engineering, System Simulation, Medical Engineering	Kaihara Toshiya Fuji Nobutada
		Optimum System Design	Nonholonomic System, Mobile Robot, Drone, Manipulator Dynamics	Urakubo Takateru
	S-2	Applied Optics	Instrumentation Optics, Information Photonics, Computational Optics, Physical Optics, Image Processing, Optical Tomography, Optical Data Storage, 3D Display System, Optical Supercomputing, Quantum Information Science	Matoba Osamu Nitta Kouichi
	S-3	Systems Control	Environment Adaptive Robotics, Cognitive Motion, Human Interface, Bio-mimetic System, Care Support Engineering, Computational Robotics, Computational Linguistics	Luo Zhi-Wei ** Quan Changqin **
Innovation of Systems Science	S-4	Mathematical System Analysis	Distributed Parameter Control Systems Theory, Infinite Dimensional Dynamical Systems, Operator Theory, Nonlinear PDEs, Mathematical and Theoretical Biology, Robust Control Theory, Nonlinear Systems Theory, Large Scale and Hybrid Systems Theory, Control System Design via Numerical Optimization, Time Delay Systems	Sano Hideki Masubuchi Izumi
	S-5	System Analysis	Intelligent Robotics, Sensor Fusion, Robot-Human Interaction, Tele-Operation System, Soft Computing, Measurement engineering, Biological information measurement, Nondestructive testing	Kobayashi Futoshi Nakamoto Hiroyuki
	S-6	Intelligent Systems	Intelligent Decision Making, Virtual Reality, Mixed Reality, Medical Engineering, Computer Aided Diagnosis and Treatment	Hatono Itsuo Yin Chengju
Applied Robot Science (Collaborative Program) *	S-7	Applied Robot Science	Manufacturing System, Instrument and Control System, Motion Planning System, Robot Control System, Human Interface System	Yoshikawa Shoji

*) For the education and research fields of the collaborative program, the research may be conducted at somewhere other than Kobe University. If you would like to enroll in a collaborative program, contact us beforehand for the details. (Contact: Kobe University Graduate School of Engineering, Students Affairs Office)

***) The faculty member is scheduled to arrive in April, 2018.

Divisions	Number	Education/Reserch Fields	Research Topics	Staff
Foundation of Information Sciences	I-1	Mathematical Logic and Statistics	Mathematical Logic, Mathematical Statistics, Foundations of Mathematics, Foundations of Informatics, Axiomatic Set Theory, Model Theory, Proof Theory, Computability Theory, Algebraic Combinatorics, Discrete and Computational Geometry	Kikyo Hirotaka ■ Fuchino Sakae Brendle Joerg Kikuchi Makoto Sakai Hiroshi Sawa Masanori
	I-2	Processor Architecture	Processor architecture, VLSI systems, VLSI memory, Low power VLSI design, Electronic Devices, Sensing Systems. Multimedia Systems, Human Interface Systems	Kawaguchi Hiroshi †
	I-3	Software Science	Logic Programming, Constraint Programming, Declarative Programming, Programming Language Processing Systems, Theorem Provers, Combinatorial Optimization, SAT	Tamura Naoyuki Banbara Mutsunori
	I-4	Telecommunications	Information and Communication Engineering, Protocol Design, Performance valuation, Parallel and Distributed Processing, Sistem Software	Ohta Chikara †
Intelligent Informatics	I-5	Integrated Information Systems	Integrated Circuit Design, Electromagnetic Compatibility, Advanced Packaging, Ubiquitous Hardware Systems, Hardware Security	Nagata Makoto † Miura Noriyuki
	I-6	Knowledge and Information Processing	Biodata Processing, Agricultural Data Processing, Information Retrieval, Content Analysis, Network Analysis, Data Integration, Data Mining, Statistical Machine Learning, Large-scale Data Analysis	Ohkawa Takenao Eguchi Koji
	I-7	Media Informatics	Speech/Image/Movie Recognition, Media Integration, Semantic Understanding, Dialogue/Conversation Processing, Intelligent Communication, Universal Communication, Disaster Information Processing, Pattern Recognition	Takiguchi Tetsuya
	I-8	Emergent Computing	Emergent System, Autonomous Decentralized System, Mathematical Programing Model, Agent Model, Adaptation/Learning Algorithm, Scheduling, Interaction	Tamaki Hisashi Urakubo Takateru
Kansei and Media Art (Collaborative Program) *2	I-9	Kansei and Media Art	Human-Robot Interaction Technology, Voice Interaction Technology, Haptic Interaction Technology, Communication Media, Partner Media, Media Presentation Techniue, Multilingual Speech Translatio, Situation Recognition Technology, Network Robotics	Shiomi Masahiro Ishi Carlos Toshinori Nishio Shuichi

*) For the education and research fields of the collaborative program, the research may be conducted at somewhere other than Kobe University. If you would like to enroll in a collaborative program, contact us beforehand for the details. (Contact: Kobe University Graduate School of Engineering, Students Affairs Office)

Those marked "†" are belonging to "Graduate School of Science, Technology and Innovation, thus you cannot choose them as your academic supervisor. They will guide in collaboration with staffs of the corresponding Education/Research field in the department.

■ The faculty member is scheduled to retire in March, 2020.

Divisions	Number	Education/Reserch Fields	Research Topics	Staff
Fundamentals of Computational Science	C-1	Basics of Computational Science	Numerical Analysis, Finite Difference Method, Finite Element Method, Parallel Algorithms, Large Scale Simulation, Program Tuning Tools, Discrete Mechanics, Differential Geometry, Global Analysis, Mathematical Engineering	Yokokawa Mitsuo Yaguchi Takaharu
	C-2	Computational Intelligence	Artificial Intelligence, Machine Learning, Multimedia Processing, Data Mining, Text Mining, Information Retrieval, Software Engineering, Service/Cloud Computing, Ubiquitous Computing	■ Uehara Kuniaki Nakamura Masahide
	C-3	Computational Fluid Dynamics	Computational Fluid Dynamics, Finite Volume Method, Finite Element Method, Massively Parallel Simulation, Coupled and Unified Simulation, Complex and Complicated Turbulence, Combustion Flow, Grid Generation, Moving Boundary Method, Applied Aerodynamics, Industrial Applications, Vehicle Aerodynamics, Automotive Engine	Tsubokura Makoto Hori Tsukasa
	C-4	Simulation Techniques	Yin-Yang Grid and Its Applications, Large Scale Simulations, Computational MHD and its Visualizations, Geodynamo, Big Data Visualization, Multivariate Data Visualization, Visual Data Analytics	Kageyama Akira Sakamoto Naohisa
Innovation of Computational Science	C-5	Computational Molecular Engineering	Massively Parallel Computing Algorithms, Explicitly Correlated Electronic Structure Theory, Strongly Correlated Electronic States, Scalable Molecular Orbital Theory, Model Space Quantum Monte Carlo, QM/MM Methods, New Energy	Ten-no Seiichiro †
	C-6	Computational Biology	Biomolecular System, Ab Initio Simulation, Multiscale Simulation, Large-Scale Parallel Computation, Medical and Pharmaceutical Applications, Molecular Dynamics Method, Molecular Orbital Method, Monte Carlo Method	Tanaka Shigenori
		Computational Robotics	Environment Adaptive Robotics, Cognitive Motion, Human Interface, Bio-mimetic System, Care Support Engineering, Computational Robotics, Computational Linguistics	Luo Zhi-Wei # Quan Changqin #
	C-7	Computational Space Science and Engineering	Numerical Simulations on the Lunar and Planetary Environments, Satellite-Plasma Interaction, Numerical Simulations on Ion Beam Application, Development of Plasma Particle Simulation Method	Usui Hideyuki Miyake Yohei
Applied Computational Science (Collaborative Program) *	C-8	Applied Computational Science	Earth Simulator, High-Performance Computing, Multiscale Simulation, Earth Sciences, Lithosphere Dynamics, Earthquakes, Plate Motion, Particle Simulation Method, Scientific Visualization, Evolution of the Earth's Deep Interior, Large Scale Linear and Nonlinear Iterative Solver	Tsuboi Seiji
Large Scale Computational Science (Collaborative Program) *	C-9	Large Scale Computational Science	Simulation of Complex Climate System, Numerical Software Library, Quantum Material Science, Lattice QCD, Biosimulation, Cellular Simulation	Tomita Hirofumi Imamura Toshiyuki Yokota Hideo Onami Shuichi Nakamura Yoshifumi Sota Shigetoshi

*) For the education and research fields of the collaborative program, the research may be conducted at somewhere other than Kobe University. If you would like to enroll in a collaborative program, contact us beforehand for the details. (Contact: Kobe University Graduate School of Engineering, Students Affairs Office)

Those marked "†" are belonging to "Graduate School of Science, Technology and Innovation, thus you cannot choose them as your academic supervisor. They will guide in collaboration with staffs of the corresponding Education/Research field in the department.

■ The faculty member is scheduled to retire in March, 2020.