Application Guidelines for Special Selection for
Doctoral Program for International Students
Graduate School of Science and Engineering
Ehime University
Academic Year 2022 (September Entrance)

1. Number of seats available

	Major	Course	Field	Seats
School of Engineering	Engineering for Production and Environment	Mechanical Engineering	・ Mechanical Systems ・ Energy Conversion Engineering ・ Production Systems and Materials for Machinery	A few
		Civil and Environmental Engineering	・ Infrastructure Technology and Design ・ Urban Planning and Watershed Environment ・ Coastal and Marine Environmental Engineering	
	Materials Science and Biotechnology	Materials Science and Engineering	・ Applied Chemical Physics ・ Materials Development and Engineering	A few
		Applied Chemistry	・ Organic and Macromolecular Chemistry ・ Physical and Inorganic Chemistry ・ Biotechnology and Chemical Engineering	
	Electrical and Electronic Engineering and Computer Science	Electrical and Electronic Engineering	・ Electrical Energy Engineering ・ Electronic Materials and Devices Engineering ・ Communication Systems Engineering	A few
		Computer Science	・ Computer Systems ・ Artificial Intelligence ・ Applied Computer Science	
Special Graduate Course on Advanced Sciences			・Environmental Sciences ・Earth Science and Astrophysics ・Life Sciences	A few

2. Application Eligibility

An applicant to this program must be a non-Japanese national residing overseas; who is eligible for the permission to stay in Japan as a student under the state regulations of immigration and refugee control, and at the same time, is a graduate of or should be expecting to graduate from a college or university that has an official academic exchange agreement with Ehime University or has collaborative research program/s with the faculty member/s of this Graduate School; and must meet one of the following requirements.

(1) An applicant must have received, or be expected to receive at the time of the admission in September 2022, a Master's degree (or equivalent) outside Japan.

(2) An applicant must be recognized by the Graduate School of Science and Engineering of Ehime University through an individual eligibility screening as having academic ability equivalent or superior to that of those who have completed a Master's program, and must be at least 24 years of age at the time of admission.

〈***Pre-application Eligibility Assessment for*** **Requirement (2)** ***above***〉

1) Application Eligibility
   An applicant to this program must be 24 years or older at the time of admission, and must have a research record or achievement as assessed by an Evaluation Committee in terms of published book/s, research papers (international/domestic journal/s or equivalent publication/s), a record of academic presentations and lectures, research reports, patent/s, etc. with greater weight than master's degree research.
2) Documents to be Submitted for Pre-application Eligibility Assessment
   A) Pre-application Eligibility Assessment Form (specified format)
   B) Research Activity Record/Achievement Form (specified format)
   C) Graduation Certificate obtained from the last attended educational institute
   D) Other reference materials (such as Research Paper/s, Patent Certificate/s, etc.)
3) Submission Deadline: **5 October 2021** (Tue)
   To be submitted only after adequate discussion prior to application regarding intention to apply for the program and related issues with the Program Chief of applicant's field of interest.
   (Must be received through **EMS** by this deadline)
4) To be Submitted/Sent to:
   Education Support Division (Engineering Team)
   Ehime University
   3, Bunkyo-cho, Matsuyama, 790-8577
   JAPAN
5) Admission Eligibility Assessment
   Based on the submitted application documents, an assessment of admission eligibility will be made, and the applicant/s will be notified of result/s by **29 October 2021 (Fri)**. Please note any submitted documents for this purpose will not be returned or used outside of eligibility status, so if you are notified that you are eligible for application, you will need to re-submit any repeated papers/documents (listed in point No. 5 of this guidelines) while submitting your application for admission. Moreover, the application eligibility assessment result will only be valid for application to the **2022** Application Guidelines for Special Selection for Doctoral Program for International Students.

3. Application Period and Selection Test

Application period	**5** (Fri)－ **12** (Fri) **November 2021** Must be received through **EMS** within this period.
Submission of application documents	Education Support Division (Engineering Team) Ehime University 3, Bunkyo-cho, Matsuyama, 790-8577 JAPAN (Further inquiries in relation with the application procedure and document submission may be made at kougakum@stu.ehime-u.ac.jp. Please send emails in English or Japanese only.)

Selection test date	Will be conducted by **8 December 2021** (Wed)
Result notification	**21 December 2021** (Tue) (A 'Letter of Notification' will be sent to successful candidates. Telephone or Email inquiries are not permitted.)

Potential applicants to this program are supposed/required to communicate with the Program Chief in their field of interest and express their interest in applying by **28 October 2021** (Thu). The email addresses for this purpose are:

Program Chief Engineering for Production and Environment	yasuhara.hideaki.me@ehime-u.ac.jp
Program Chief Materials Science and Biotechnology	hayashi.minoru.mm@ehime-u.ac.jp
Program Chief Electrical and Electronic Engineering and Computer Science	jinno.masafumi.mh@ehime-u.ac.jp
Program Chief Specoal Graduate Course on Advanced Science	morimoto.akihiko.cl@ehime-u.ac.jp

4. Selection Criteria

1) Method
   Selection for admission to this program will be made on the basis of integrated evaluation of submitted documents and performance in the interview (internet-based interview).
2) Interview question content (including the oral test)
   The interview questions will be based on the master's degree thesis research, research activities and achievements, doctoral research plan, etc.

5. Application Material and Documents to be Included

A. Completed application form including the Entrance Test Admission Card and Personal Identification Card with a photograph (*provided with the application material; **Form#1***)
   (The photograph should be 30-mm wide and 40-mm high (30mmx40mm) showing the torso and face of the applicant. The applicant should be facing forward and not wearing a cap/hat. The photo should have been taken no more than 3 months prior to the date of application).
B. Officially sealed copies of Grade Sheets or Transcripts of Bachelor's Degree course issued by the graduating university or college
C. Graduation Certificate obtained from the last-attended educational institution
D. Officially sealed copies of Grade Sheets or Transcripts of Master's Degree issued by the graduating university or college
E. A copy of Master's Degree Certificate or Certificate of expected date of graduation issued by the graduating university or college
F. Officially sealed Letter of Recommendation from the Dean/Principal/Campus Chief or a high-ranking official of the graduated/graduating university or college (*provided with the application material; **Form#2***)
G. A written pledge indicating the possibility of arriving in Japan on or before **21 September 2022**(Wed) if selected (*provided with the application material; **Form#3***)
H. Research Plan or Proposal on the specified paper (*provided with the application material; **Form#4***)
   (Regarding the research topic or field, research concept, objectives and methodology, an applicant must discuss in advance with their expected research supervisor)
I. Summaries of Master's thesis (outline) and published research papers and related

achievements
The summary of the Master's thesis or any equivalent research material should be about 2,000 letters in Japanese or about 500 words in English. Additionally, if you have similar research content in printed/published form, have a technical report, and possess any patents or innovative plans, please include a brief summary of each with the application material. Also, as far as possible, please include a copy of each published research paper.

J. A copy of applicant's passport details (front page personal details); if unavailable at the time of application, it must be submitted at the time of entrance examination

K. Application Processing Fee
The application processing fee is 30,000 yen. If paying by remittance from an overseas bank or financial institution, you must confirm that the amount to be transferred (remitted) to us is 30,000 yen exactly; an equivalent amount in another currency will not be accepted. You may ask the bank or financial institution to make the payment in Japanese currency so that they do not deduct their handling charges and the service charges at paying bank in Japan from the amount of application processing fee at the time of making the bank transfer (remittance). Please include the bank transfer slip (payment application form) with the application material.

1) Amount to be remitted: 30,000 yen (exact amount payable only in yen)
(Please pay the remittance fee at the time of remittance. If there are related bank fees and expenses in addition to the remittance fee, please pay by the sender.)

2) Bank account details for transferring the application processing fee

Bank Name:	THE IYO BANK LTD.
Bank Code:	0174
Swift Code:	IYOBJPJT
Branch Name:	ICHIMAN BRANCH
Branch Code:	109
Branch Address:	2-20-1 KATSUYAMA-CHO, MATSUYAMA 790-0878, EHIME, JAPAN
Account Number:	1799161
Account Holder's Name:	NATIONAL UNIVERSITY CORPORATION EHIME UNIVERSITY 10-13 DOGO-HIMATA, MATSUYAMA 790-8577, EHIME, JAPAN

3) Period of payment: From **25**(Mon) **October** to **1** (Mon) **November 2021, 17:00** (Japan Standard Time, strictly within this period)

4) Remittance method: TELEGRAPHIC REMITTANCE

5) Paying bank charges: To be paid by the sender (applicant)

6) Additional information: When sending a remittance, write university entrance examination fee as the purpose of the remittance, and your full name as well as the name of the graduate course under message.

Note: If the application processing fee is insufficient (i.e. less than 30,000 yen), your application documents will be regarded as incomplete and your applicant material will be rejected. In such a case, the remitted application processing fee will be returned, but any charges payable to the bank in Japan as well as the applicant's side will have to be

borne by the applicant himself/herself. However, the application processing fee will not be returned in any other cases except for the conditions listed under **Point6** of this Application Guideline.

6. Return of the Application Processing Fee

The paid or remitted amount of Application Processing Fee will be returned in the following case/s only (Note: any charges payable to the bank in our side as well as the applicant's side will have to be borne by the applicant himself/herself.).

1) The Application Processing Fee was paid, but application papers were not sent/submitted
2) Mistakenly paid the Application Processing Fee two or more times, or paid an amount greater than the required amount of 30,000 yen
3) Sent/submitted the application documents, but the application was rejected

〈Requesting for the return of the Application Processing Fee〉

In cases of **condition 1) or 2)** above, please contact us at the address below. We will send you a 'Request for Return of the Application Processing Fee' form, which you must fill out and send back to us by post. In case of **condition 3)**, however, we will send you the 'Request for Return of the Application Processing Fee' form along with your application documents, which you must fill out and send back to us by post.

Communication Address:
The External Payment Affairs Team
Financial Planning Division
Finance Department, Ehime University
10-13 Dogo-Himata, Matsuyama 790-8577, Ehime, JAPAN
E-mail : suitou@stu.ehime-u.ac.jp

7. Application Method

The application forms and necessary information may be downloaded from the Ehime University website (https://www.ehime-u.ac.jp/english/). To apply for this program, all applicants must send completed application forms and necessary documents to us by post/mail.

8. Admission Formalities and Period

(1) The following are necessary at the time of admission.
1) Admission Fee of **282,000 yen**
2) Graduate school-specified admission forms/papers
3) **8,000 yen to 10,000 yen** as miscellaneous charges/fees

(2) Admission Period

Admission will take place on **24 September 2022(Sat)** The details will be sent to successful candidates at a later date.

(3) Tuition Fee

A tuition fee of **267,900 yen** for the first semester and an equal amount for the second semester (Annual tuition fee: **535,800 yen**) must be paid after the admission/enrollment. The admission fee and tuition fee may be revised (in most cases increased) at the time of admission or even after/during enrollment, which will be applicable from the date of revision. Successful candidates will be separately notified of the period for tuition fee payment.

9. Privacy Policy (Use of personal information)

Any personal information provided in application forms such as names and addresses is solely for processing applications, contacting applicants if an application document is incomplete, conducting entrance examination, notifying successful applicants, and sending admission procedure documents. If an application document is incomplete, Ehime University may notify the applicant's guardians or school to request the document be promptly amended and resubmitted. It is also used for academic affairs after enrollment (student registration, educational guidance), student support services (health-care management, scholarship applications), tuition administration, and to conduct surveys and research (improve entrance examinations, study and analyze application trends). The personal information will not be used for any other purpose and will not be provided to third parties.

10. Important Note

After receiving the application documents, no changes will be allowed in the application information or submitted under any conditions. The documents and application forms cannot be returned. The submitted application documents must be complete, accurate, and authentic. Incomplete, inaccurate, or unauthentic application documents may result in denial of admission.

11. Outline and staffs

Engineering for Production and Environment

Course	Field	Research outline	Staffs and Research Fields
Mechanical Engineering	Mechanical Systems	This division consists of three education and research fields : dynamics of machinery, control engineering, and robotics. The major subjects of our research area contain the followings : dynamics of solids and structures, shape optimization, intelligent control, ergonomics, mechatronics, and intelligent systems.	Shingo Okamoto Robotics Dynamics, Vibration and Control, Computational Mechanics Satoru Shibata Control systems of intelligent machines for coexisting with Humans JaeHoon Lee Robotics, mechatronics and intelligent sensing Tomonori Yamamoto Robotics, Mechatronics, Human-machine interface, Welfare Engineering Takayuki Tamaogi Evaluation of Dynamic properties for viscoelastic materials
	Energy Conversion Engineering	This division consists of four education and research groups : thermal engineering, fluids engineering, heat and mass transfer engineering, and mathematical engineering. The staff members engage in instruction and research on thermal engineering, aerothermodynamics, fluids engineering, rheology, sustainable energy, zero emission process, partial differential equations, and numerical analysis.	Shinfuku Nomura Plasma process and sono-process Kazunori Yasuda Non-Newtonian fluid mechanics and its application Masaya Nakahara Smart control of combustion for hydrogen and hydrocarbon Energy Kazuo Matsuura Turbulence simulation of thermofluid flows, hydrogen safety simulation Shinobu Mukasa Electric discharges in a high-density medium and heat and mass transfer phenomena Yukiharu Iwamoto Fluid transport and its application to engineering
	Production Systems and Materials for Machinery	This division is composed of several research groups of material engineering, mechanics of materials, production processing and innovate materials processing etc. The object of this division is to conduct academic research on various problems concerning solid-state physics and strength evaluation of advanced materials, creation of new materials, innovative materials processing, advanced plastic forming of metals, and fabrication and machining of CFRPs.	Keiji Ogi Mechanical modeling and strength reliability of composite materials, Processing and machining of CFRPs. Manabu Takahashi Strength and damage evaluation of advanced structural materials Hiromichi Toyota High-rate material synthesis using in-liquid plasma Susumu Tanaka Research on ship performance and ship equipment Xia Zhu Material and structural design through special processing Technology Masafumi Matsushita Materials synthesis through extreme condition

Course	Field	Research outline	Staffs and Research Fields
Civil and Environmental Engineering	Infrastructure Technology and Design	In this field, the research work and course curriculum include a large variety of topics related to construction materials, design and construction methods, and seismic behaviors of infrastructures such as bridges, dams, roads, underground facilities, etc.	Isao Ujike Studies on mass transport properties of concrete and at cracking and on time-dependent behavior of deformation and cracking in reinforced concrete member. Mitsu Okamura Seismic stability of foundations and earth structures as well as development of countermeasure technique and design methodology. Netra Prakash Bhandary Landslides and creeping displacement mechanism, Development of landslide preventive techniques, and GIS for landslide, slope instability, and earthquake hazard assessments. Kazuyuki Nakahata Large scale numerical computing of elastodynamic wave, and electromagnetic have for nondestructive evaluation of structural components, Health monitoring with wireless sensor manufactured by MEMS technique Hideaki Yasuhara Mechanical and hydrolical behavior of fractured rock masses under coupled thermo-hydro-mechano-chemo fields Naoki Kinoshita Thermally induced properties of rock and behavior of rock caverns, Utilization of industrial waste for construction materials. Keiyu Kawaai Electro-chemical techniques for assessing durability performances, structural integrity of reinforced concrete and effect of repair including self-healing for cracking in concrete

	Urban Planning and Management	Towards building a highly convenient urban environment of the 21st century, the research work in this field of study includes a variety of topics related to urban life, industrial environment, disaster management, traffic / transportation systems, operations and maintenance.	Toshio Yoshii Urban transportation systems, Traffic management strategies, Measures for improving traffic safety, Dynamic traffic simulation Nobuhiko Matsumura Regional resource management, Social network analysis Tohru Futagami Urban disaster preventive planning under a great earthquake and development of urban information system Shinya Kurauchi Analysis and modeling on travel decision-making processes, Travel demand forecasting and evaluation of transport policies Tsuyoshi Hatori Consensus formation around a public project, Social dilemmas, Regional governance
	Watershed and Coastal Environmental Engineering	Scientific researches in the fields of river, watershed, and coastal environment are indispensable for the sustainable development of infrastructures. Interdisciplinary educational programs and researches from physical, chemical, and ecological aspects, are provided for a better understanding and elucidation of the natural environment in river, urban/natural watershed, and coastal/ nearshore areas as well as for exploring solutions against natural disasters.	Hirofumi Hinata Development of tsunami disaster mitigation technique based on oceanographic redar and numerical simulation. Research on marine pollution caused by plastics in terms of physical oceanography. Ryo Moriwaki Urban climate formation process, Water circulation in the basin, Utilization technology of renewable energy. Kozo Watanabe DNA taxonomy for biodiversity evaluation, Evaluation of genetic diversity of aquatic organisms, Application of DNA-based analysis in river management Akihiro Kadota Turbulent flow structure in rivers and flow visualization Yo Miyake Impacts of human activity on stream organisms, Conservation of stream ecosystem, Evaluation of stream environmental condition by stream organisms. Tomoya Kataoka Assessment of environmental loads from land to oceans and development of remote sensing technique in aquatic environment.

Materials Science and Biotechnology

Course	Field	Research outline	Staffs and Research Fields
Materials Science and Engineering	Materials Properties Engineering	This educational and research field consists of 5 subjects : The "Quantum Materials Group" studies semiconductors, magnetic materials and ceramics, nano materials ; the "Solid State Physics Group" studies condensed matter physics with an atomic scale ; the "Materials Control Engineering Group" studies the fine structures closely related to material properties and its control through an atomic scale ; the "Electrical and Electronic Materials Group" studies electrical and electronic properties of dielectric materials and conductive polymers ; the "Materials Processing Engineering" studies the processing, the properties and the structure of glasses and ceramics for new functionality.	※Koichi Hiraoka Solid state physics of magnetic materials (such as transition-metal compounds and rare-earth compounds) and strongly correlated electron systems. Hiromichi Takebe Research on processing, properties and structure of new photonic glasses and ceramics. Sengo Kobayashi Researches on phase transformation in various materials such as biomaterials and structural materials and on microstructures at/ around interface in composite materials. Haruo Ihori Research of electro optical measurement of electric field vector distribution in dielectric liquids, and reuse of used papers by lasers. Akira Saitoh Present research areas covering characterization and structure of transparent amorphous materials. Hideaki Sasaki Research on production technology and recycling of metallic materials, including base metals (such as iron and copper) and rare metals. Saeki Yamamuro Size-and shape-controlled synthesis of nanoparticles and their functionalities.
	Materials Development and Engineering	The "Environment and Energy Materials Group" studies the preparation of new functional nano particulates, composite materials, porous materials, etc. used for medical treatments, fuel cells, chemical sensors, catalysts, radioactive Cs decontamination, etc. The "Medical and Biomaterials Engineering Group" studies the development of biocompatible ceramics and magnetic materials. The "Materials Evaluation Group" studies mechanical properties of welding joint and advanced welding processes in structural metal materials.	Hiromichi Aono Studies of materials such as nano-sized particles, poly-metallic oxides, porous materials for application of medical care, fuel cell, chemical sensor, catalyst, and decontamination Tomoki Yabutani Development of paper-based sensor chips for clinical and environmental analysis, and production process of cellulose nanofibers and their applications. Yoshiteru Itagaki Development of solid oxide catalysts and their application for chemical sensors and solid oxide fuel cells Takashi Mizuguchi Development of thermo-mechanical, alloying techniques and welding processes for improvement of mechanical properties of welding joint in structural metal materials

※Scheduled to retire in March, 2023

Course	Field	Research outline	Staffs and Research Fields
Applied Chemistry	Organic and Macromolecular Chemistry	The Organic and Macromolecular Chemistry field is trying to contribute to the progress of the modern society by devising novel processes for material synthesis and creating new functional materials, based on the profound understanding and precise control of a variety of chemical reactions. Research groups in this field are attempting to newly develop such objectives as methodologies for organic and polymer synthesis, heteroatom- and transition-metal-catalyzed reactions, environmental friendly chemical processes, redox-active organic molecular materials, organic （super） conductors and materials derived from their multi-functionalization, and functional materials based on organic polymers.	Yohji Misaki Development of organic molecular materials utilizing redox systems Eiji Ihara Development of new method for polymer synthesis Minoru Hayashi Development of new synthetic methodologies using heteroatoms and transition metals Takashi Shirahata Development of new organic conductors and multi-functional materials
	Physical and Inorganic Chemistry	The Physical and Inorganic Chemistry field is focusing to functional solid materials having nano- and mesostructures of inorganic and organic compounds, polymer, and their hybrid systems from the viewpoints of their fundamental physiochemical properties as well as their applications to catalysts, sensors, electronic devices, and so on. The subjects include the synthesis of mesoporous materials and the applications to catalysts and gas sensors, photoelectron spectroscopy of nanocarabons and organic-inorganic hybrid materials, development of polymer-based chemical sensors, preparation of noble organic nanoparticles and their applications, and liquid extraction techniques of rare earth elements.	Hidenori Yahiro Syntheses and applications of meso- and microporous materials Tsuyoshi Asahi Laser fabrication and spectroscopy of noble organic nano-materials Masanobu Matsuguchi Design of functional polymers and its application to a chemical sensor Hiroshi Yamashita Study on separation technology of rare metals Syuhei Yamaguchi Development of environment-friendly catalysts with transition metal complexes

	Biotechnology and Chemical Engineering	There are research groups focusing on structure function relationships in biomolecules such as proteins and nucleic acids, methods for separation and wastewater treatment, plant biotechnology, protein engineering, and applications of protein production methods to synthetic biology and medicine.	Tatsuya Sawasaki Functional proteomics using wheat cell-free system Kazuyuki Takai Reconstitution of protein synthesis Hiroyuki Hori Structures and functions of nucleic acids and proteins related to expression of genetic information ※Kenji Kawasaki Wastewater treatment, excess sludge disposal and solid liquid separation Eizo Takashima Biochemical analysis of malaria parasites Hiroyuki Takeda Technological Development for Antibody therapeutics

※Scheduled to retire in March, 2023

Electrical and Electronic Engineering and Computer Science

Course	Field	Research outline	Staffs and Research Fields
Electrical and Electronic Engineering	Electrical Energy Engineering	Research activities cover the development of plasma electronics, plasma diagnostics and plasma medicine, studies on high field conduction and breakdown in dielectrics, mathematical analysis of chaotic dynamical systems, and liquid crystal applications, soft matter science and numerical simulation of electromagnetics.	Kazunori Kadowaki Degradation diagnosis of electrical insulation materials and application of streamer discharges for control of air and water pollution Masafumi Jinno Plasma electronics. Plasma gene transfection, bio-medical application and environmental preservation. Numerical modelling of plasma. Lighting. Tomoki Inoue Ergodic theory on dynamical systems with chaos, Mathematical foundations towards application of chaos and fractals Ryotaro Ozaki Research on optical properties of nano-structured liquid crystals or polymers. Numerical simulation of light propagation in nanostructured materials Hideki Motomura Generation and control of plasmas and their diagnostics for industrial applications Yoshihisa Ikeda Lighting and visual effect, Visibility enhancement, effective luminance enhancement, color rendering property enhancement, and glare reduction
	Electronic Materials and Devices Engineering	Research activities cover the development of crystal growth, optical characterization and application of compound semiconductors, preparation of rare-earth activated phosphor materials, and fabrication of semiconductor nano structures.	Satoshi Shimomura Fabrication of semiconductor nano structures by molecular beam epitaxy and application to optical and electronic devices. Sho Shirakata Preparation and characterization of thin film compound solar cells, and crystal growth and characterization of GaN, GaInNAs and ZnO semiconductor. Optical properties and device applications of III-V semiconductors doped with transition-metal and rare-earth impurities. Tomoaki Terasako Growth and characterization of metal oxide films and nanostructures for opto-electronic devices. Fumitaro Ishikawa Exploration of new functional materials and structures based on compound semiconductor epitaxial growth.

	Communication Systems Engineering	The research activities cover the signal processing for high-density digital magnetic and optical recording systems, investigation of fundamental properties of subwavelength optical elements including holograms, media processing algorithms related to motion, neural networks applications to signal and image processing, sequence design and signal processing for baseband spread-spectrum communications.	Yoshihiro Okamoto Research on channel coding and signal processing techniques to achieve high density recording in digital information storage systems Shinji Tsuzuki （1） Research on sequence design and signal processing for baseband spread-spectrum communications, and its application to power-line communication （2） Analysis of CDMA based protocols （3） Developing high-definition video transmission systems over IP network ※Hiroyuki Ichikawa Investigation of fundamental properties of subwavelength optical elements including holography and their application and electromagnetic analysis of light wave propagation. Yasuaki Nakamura Research on error correction coding and iterative decoding systems for information storage

※Scheduled to retire in March, 2023

Course	Field	Research outline	Staffs and Research Fields
Computer Science	Computer Systems	Research fields of the Division of Computer Systems include dependable systems, software for high performance computing, software quality management, and distributed and parallel processing systems. Research aims at improving reliability, functionality, and performance of computer systems.	Shin-ya Kobayashi Distributed processing, parallel processing and cooperative processing. : Secure processing for distributed processing. Service and application on distributed environment. Distributed transaction processing. Hiroshi Takahashi Design and Test of Computers, Dependable system design, Digital Systems Testing and Diagnosis, Design of Digital Systems using Hardware Description Language Yoshinobu Higami Design, Test and Diagnosis of VLSI Circuits：Test Pattern Generation, Design for Testability, CAD System for VLSI Design Hiroshi Kai Researches on systems and algorithms of Computer Algebra, especially symbolic-numeric hybrid computations, middleware and network security. Keiichi Endo Ad-hoc networks, peer-to-peer networks, sensor networks
	Artificial Intelligence	We are working on the following areas : Knowledge representation and inference systems on computers ; pattern recognition and clustering by neural networks ; image processing ; watermarking technology of images for copyright protection ; encoding methods for information security ; virtual reality ; natural language processing ; and machine learning.	Takashi Ninomiya Natural Language Processing and Machine Learning : part-of-speech tagging, parsing for linguistically sophisticated grammars, machine translation, online learning and feature selection. Toshiyuki Uto Multimedia Signal Processing : image compression, wavelets, filter banks, and 3-D graphics processing

	Applied Computer Science	1. Applied mathematics, and basic theory and algorithms of computations in science and engineering : partial differential equations, their numerical solutions and numerical conformal mappings. 2. Scientific computer simulations for natural sciences : parallel computing, high-performance computing, grid computing, performance estimation model and performance evaluation. 3. Information network and data processing for science and engineering. Applications of information network, software technique, distributed database. 4. Cognitive science : pattern cognition, human information processing. 5. Applications of multimedia information, contents production, coding, processing and service systems.	※Hiroshi Ito Mathematical Physics : Mathematical scattering theory, Inverse scattering problem Kazuto Noguchi Optical communication systems and applications : optical devices, optical transmission systems, telemedicine. Minoru Kawahara Informatics : information networks, information and communication system, data mining, information and communication supports. Dai Okano Numerical Analysis : Numerical method for partial differential equations, optimizations, the method of fundamental solutions. Hisayasu Kuroda High performance Computing : Development of high performance numerical library, large-scale numerical simulation on multiprocessors. Hirohisa Aman Empirical software engineering : software quality quantification using software metrics, and statistical model for quality assessment/prediction. Kazunori Ando Mathematical Physics : Scattering theory and inverse scattering problems for discrete Schrödinger operators on graphs

※Scheduled to retire in March, 2023

Special Graduate Course on Advanced Sciences

Field	Research outline	Staffs and Research Fields
Environmental Sciences	This division conducts, on the basis of physics, chemistry and biology and their interdisciplinary field, cutting-edge studies on the structure and variation mechanisms of the environment and ecosystems in coastal waters and their related environmental issues, and pollution and toxic effects of hazardous chemicals on a regional and a global scale. Students can mainly study environmental dynamics, environmental chemistry and environmental biology.	Xinyu Guo Simulation of the Kuroshio, Interaction of the Kuroshio and coastal water, Marine environmental prediction of Seto Inland Sea Akihiko Morimoto Studies on variability in ocean currents using remote sensing and hydrographic observation, and material cycle in coastal seas. Michinobu Kuwae Long-term variability of ocean-atmosphere-ecosystem : regime shift and fisheries productivity dynamics. Late Holocene climate dynamics on centennial timescales in the North Pacific. Impacts of transboundary pollution and global warming on marine and lake ecosystems. Hisato Iwata Ecotoxicology of wildlife and species-diversity of disruption of cellular signaling pathway by environmental chemicals Tatsuya Kunisue Development of analytical methods for novel environmental contaminants with hormone-like activity and its application to ecotoxicology Kei Nomiyama Metabolic disposition and risk assessment of organohalogen compounds in wildlife Shin-ichi Kitamura Outbreak mechanisms of fish infectious diseases by marine environmental changes Kozo Watanabe Molecular biology to study biodiversity and evolution of freshwater organisms and eco-epidemiological studies for the control of mosquito-borne diseases

Earth Science and Astrophysics	This division aims to nurture the researchers who have advanced knowledge and research competency through the studies on the structure and dynamics of the Earth, planets, and universe in GRC and RCSCE. The division consists of four terrains of high-pressure mineralogy, theory of Earth and planetary materials, galaxy evolution, and X-ray astrophysics.	Taku Tsuchiya Theoretical and computational study of minerals and modeling the Earth and planetary interiors. Hisamitsu Awaki Study of structure and evolution of the Universe. In particular, study of active Universe through cosmic X-ray emission, and development of instruments for X-ray observatory. Yuichi Terashima Study of high energy phenomena in the Universe. In particular, observational study of black holes and the structure and evolution of the Universe. Tohru Nagao Observational studies on the formation and evolution of galaxies and supermassive black holes. Studies on the chemical evolution of the Universe. Masanori Kameyama Mantle Dynamics ; Studies on flows, deformations, and evolutions of the Earth's interior based on the computational fluid dynamics. Yu Nishihara Experimental study on transport properties (such as rheology) of deep Earth materials. Jun Tsuchiya Computational study of the existence and its effects of volatile elements in the Earth's interior. Yoshio Kono Experimental study of magmas under pressure using high-pressure synchrotron X-ray techniques Tohru Shimizu Space plasma physics, fast magnetic reconnection based on MHD and kinetic theory and numerical studies. Masaru Kajisawa Observational studies of galaxy formation and evolution. History of star formation and mass assembly of galaxies. Yoshiki Matsuoka Observational research on the evolution of galaxies,supermassive black holes, and the Universe. Takeshi Sakai Study of equations of state of terrestrial planet materials using laser heated diamond anvil cell

Life Sciences	This division provides education programs focusing on protein sciences, and has four main lecture contents that are grappled with in Proteo-Science Center : infectios molecular science, photo-life science, molecular life science, and protein function science.	Hiroyuki Hori Structures and functions of nucleic acids and proteins related to expression of genetic information Eiji Ihara Development of new method for polymer synthesis Kazuyuki Takai Reconstitution of protein synthesis ※ Hidemitsu Uno Synthesis of bioactive compounds and highly functional materials of organic dyes. Tatsuya Sawasaki Functional proteomics using wheat cell-free system Miwa Sugiura Studies on the molecular structure and function of Photosystem II Atsushi Ogawa Development of new biotechnologies based on cell-free systems Eizo Takashima Biochemical analysis of malaria parasites

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