

Programs	Research Fields	Faculty	Research Topics
Mechanical and Electrical Engineering	Thermal and Fluid Energy Engineering	(Prof.) Kazuhiro HAYASHIDA	Improvement of engine combustion technology and engine performance under low temperature conditions.
		(Prof.) Shinichi MORITA	Latent heat storage system, Heat transfer enhancement of fluid including nano-sized dispersoid
		(Assoc. Prof.) Toru Uenishi	Carbon dioxide capture and recycling technology, Fuel cells, Exhaust gas aftertreatment systems
		(Assoc. Prof.) Kazunori TAKAI	Flow-Induced Vibration, Fluid-Structure Interactions.
		(Assoc. Prof.) Masanori MATSUMURA	Analysis of vortex structures and flow control in turbulent shear flows.
		(Assoc. Prof.) Yoichi MITO	Analysis of transport mechanisms in fluid turbulence using numerical simulation.
	Electrical and Chemical Energy Engineering	(Prof.) Tomoya OHNO	All solid state Li-ion battery. Ceramis Nano-coating on Nano-particles.
		(Prof.) Shinya OBARA	Hydrogen energy, Distributed power supply, Microgrid, Gas hydrate power system, Operation planning.
		(Prof.) Mayumi TAKEYAMA	3D-Integration, Ultra-power-saving next-generation device
		(Assoc. Prof.) Atsushi UMEMURA	Design and analysis of wind energy conversion system, Analysis of power system dynamics, Analysis and control of rotating electrical machines. Control of power electronic equipments.
		(Assoc. Prof.) Noriyasu OKAZAKI	Manufacture of turquoise hydrogen and nanocarbon, Gasification of waste plastic, Denitration of combustion exhaust gas, Environmental catalysis
		(Assoc. Prof.) Hiroto SAKAGAMI	Manufacture of turquoise hydrogen and nanocarbon, Study on effective utilization of underutilized energy resources
		(Assoc. Prof.) Masaru SATO	2.5D/3D LSI process engineering
		(Assoc. Prof.) Rion TAKAHASHI	Design and analysis of wind energy conversion system, Analysis of power system dynamics, Analysis and control of rotating electrical machines.
		(Assoc. Prof.) Shigeto HIRAI	Development and characterization of electrocatalysts for the activation of next generation energy conversion technologies
	Design and Manufacturing Systems Engineering	(Prof.) Sharifu URA	3D Printing, Industry 4.0, Precision Machining, Sustainable Product Development
		(Prof.) Michihiro SATO	Turn motion analysis and skill evaluation of alpine ski athletes.
		(Prof.) Yutaka YOSHIDA	Evaluation of defects in materials using electron microscope
		(Assoc. Prof.) Yoshiki KAWANO	Development of numerical methods and systems to evaluate mechanical properties in materials and their application to metals and bones
	Computational Intelligence and Biomechanical Systems Engineering	(Prof.) Takashi OKUMURA	Artificial intelligence in medicine Public health informatics Health crisis management Policy assessment for healthcare information systems
		(Prof.) Yohei HOSHINO	Study on vibration analysis and control for higher efficiency mechanical systems and application of robot technology
		(Assoc. Prof.) Yasumasa KANEKIYO	Design and synthesis of stimuli-responsive molecular recognition systems.
		(Assoc. Prof.) Ikuo SUZUKI	Emergence of information based on complex systems.
		(Assoc. Prof.) Yoshihiko HAYAKAWA	Computer Assisted Radiology and Surgery
		(Assoc. Prof.) Liangliang YANG	Agricultural machinery, field vehicle type robots, Machine vision and AI in agriculture.
		(Assoc. Prof.) Abhijeet RAVANKAR	Study of autonomous mobile robots and artificial intelligence (AI). Application of Robotics & AI in service automation, agriculture, self driving cars, and healthcare.

Programs	Research Fields	Faculty	Research Topics
Civil and Environmental Engineering	Structural Engineering and Structural Materials	(Prof.) Masumi INOUE	Study on durability and workability of cold weather concrete.
		(Assoc. Prof.) Takehiko SAITO	Study on seismic isolation devices and disaster prevention in cold regions.
		(Assoc. Prof.) Heesup CHOI	Study on behavior prediction and self-healing of cracks in concrete structure.
	Geosphere Engineering	(Prof.) Takayuki KAWAGUCHI	Study on ground behavior in cold regions and ground reinforcement.
		(Prof.) Dai NAKAMURA	Study on changes in physical properties of rock due to freeze.
		(Prof.) Satoshi YAMASHITA	Evaluation of stress-strain testing of geomaterial.
	Mobility Management Engineering	(Prof.) Kiyoshi TAKAHASHI	Evaluation of transportation project.
		(Assoc. Prof.) Kazuya TOMIYAMA	Human factor-based evaluation of transportation infrastructure
	Hydraulic Engineering	(Prof.) Katsuaki KOMAI	Modeling on water resources management, water pollution, aquatic ecosystem, and blue carbon
		(Prof.) Yasuharu WATANABE	Channel formation process and river disaster prevention.
		(Assoc. Prof.) Hidekazu SHIRAI	Study on waves and current flows in estuarine and constal regions.
		(Assoc. Prof.) Yasuhiro YOSHIKAWA	Study on flood control, water-utilization and environment of river in cold regions.
	Glaciology and Gas Hydrate Engineering	(Prof.) Takao KAMEDA	Clarifying the mechanism relating to snow and ice (snow crystals, blowing snow and curling stone etc.), and cold temperatures in Japan and the Antarctic
		(Prof.) Akihiro HACHIKUBO	Thermal properties of snow, ice and gas hydrate.
		(Prof.) Hirotsugu MINAMI	Development of analytical methods for the determination of trace elements in material and environmental samples.
		(Assoc. Prof.) Hiroshi OHNO	Physicochemical properties of ice and gas hydrate
		(Assoc. Prof.) Masato KIDA	Study on clathrate hydrate-based technologies
		(Assoc. Prof.) Tatsuo SHIRAKAWA	Changes in snow and ice environments associated with climate change and its impact on transport.
		(Assoc. Prof.) Kazutaka TATEYAMA	Glaciological studies in the ice covered seas using satellite and in-situ data.
		(Assoc. Prof.) Akira HORI	Environmental conservation and physical properties of ice in cold regions.

Programs	Research Fields	Faculty	Research Topics
Information and Communication Engineering	Wave Informatics and Communications	(Prof.) Tatsuya KASHIWA	Numerical analysis of microwave circuits and antennas, Analysis of digital communication systems.
		(Prof.) Masakiyo SUZUKI	Sensor array signal processing, Acuity in ranging based on FM-FM neurons in the auditory cortex of mustached bats, Design of information management systems
		(Prof.) Koichi HIRAYAMA	Research on numerical analysis and design of optical and microwave waveguide devices.
		(Assoc. Prof.) Jun-ichiro SUGISAKA	Hybrid artificial intelligence using holograms and computers, design of computer-generated hologram, and application of numerical scattering simulation
		(Assoc. Prof.) Kenji TAGUCHI	Study on biomedical EMC and optimal design of electromagnetic device using numerical simulation
		(Assoc. Prof.) Takashi YASUI	Numerical analysis and design of optical waveguide devices.
		(Assoc. Prof.) Shingo YOSHIKAWA	Underwater acoustic communication and localization.
	Data Science	(Prof.) Toshio EISAKA	Control system design and its application. Robot Informatics.
		(Prof.) Yasunari MAEDA	Knowledge information processing and its applications.
		(Prof.) Hiroshi MASUI	Study of scientific database and application.
		(Prof.) Fumito MASUI	Natural Language Processing and its application, Curling Informatics and Tourism Informatics.
		(Assoc. Prof.) Takeshi KAWAMURA	Stability analysis and synthesis for control system, Robotics, Intelligent Transport Systems(ITS), and Forest Engineering.
		(Assoc. Prof.) Michal Edmund PTASZYNSKI	<b>General:</b> Natural Language Processing, Artificial Intelligence, Affective Computing, <b>Specific:</b> Cyberbullying Detection, Depression Detection, Affect Analysis, Ainu Language Processing
	Information Optics	(Prof.) Kenji KUROKAWA	Reliability of optical fiber when exposed to high-power light for ultra high capacity optical communication
		(Prof.) Kenji HARADA	Holographic recording using organic materials and its application.
		(Prof.) Noriaki MIURA	Development of image restoration methods.
		(Assoc. Prof.) Daisuke SAKAI	Holography, Optical property around transparent medium, Display technique for optical information.
		(Assoc. Prof.) Takatoshi SHIBUYA	Extragalactic Astronomy, Observational Astronomy, Early Universe, Big Data Analysis, Digital Image Processing, Artificial Intelligence
		(Assoc. Prof.) Hiroyasu SONE	Optical information processing using optical device.
		(Assoc. Prof.) Yasuhiro HARADA	Optical instrumentation and manipulation of micro objects based on light scattering phenomena and its application.
	Mathematical Science	(Prof.) Okihiro SAWADA	Theories of Partial Differential Equations
		(Assoc. Prof.) Yuichi KABAYA	Hyperbolic geometry and topology.
		(Assoc. Prof.) Fumihiko NAKAMURA	Ergodic theory and Random dynamical systems
		(Assoc. Prof.) Kazunori MATSUDA	Commutative ring theory and Combinatorics

Programs	Research Fields	Faculty	Research Topics
Applied Chemistry	Advanced Materials Chemistry	(Prof.) Takeshi MATSUDA	Development of catalysts for effective utilization of natural resources and for hydrogen production.
		(Prof.) Miki MURATA	Synthesis of organoboron and - silicon compounds by transition - metal - catalyzed coupling reactions.
		(Prof.) Shinji WATANABE	Synthesis of aromatic polyester and polyether. Synthesis of polymer microsphere having mercapto groups.
		(Assoc. Prof.) Masayuki UTO	Design and development of chemical sensors mimicking biological functions.
		(Assoc. Prof.) Takeshi NAMIKOSHI	Synthesis of functional polymeric materials by living polymerization.
	Advanced Materials Engineering	(Prof.) Naohumi OHTSU	Development of biofunctional metallic implants for medical application, Analysis of bio/biomaterial interface reaction
		(Prof.) Midori KAWAMURA	Black metal films for chemical sensor application, Development of ultra-pure metal film deposition process, High-performance thin-film materials utilizing nanolayers
		(Prof.) Kyung Ho KIM	Optoelectronic devices based on nanostructures.
		(Prof.) Hiroyuki SHIBATA	Development of superconducting sensor and its application
		(Assoc. Prof.) Takayuki KIBA	Development and characterization of metal/semiconductor nanostructured materials and their application to optical devices
	Biotechnology and Food Engineering	(Prof.) Hirofumi ARAI	Suppression of allergy and inflammation by food factors using cell lines.
		(Prof.) Masaaki KONISHI	Investigation and application for environmental microorganisms, development of bioprocess.
		(Prof.) Toshitsugu SATO	Molecular breeding of edible mushrooms (shiitake mushroom etc.), and analysis of agricultural products fermented by mushrooms
		(Assoc. Prof.) Tai-Ying CHIOU	Analysis and application of food microorganisms, and development of novel fermented food.
		(Assoc. Prof.) Ken YOKAWA	Bioengineering of plant environmental adaptation and metabolism
	Resource and Environment Chemistry	(Prof.) Toru KANNO	Application of ceramic material to drug delivery and environmental material.
		(Prof.) Tohru SAITOH	Development of separation methods for environmental analysis, environmental technology, and resource recovery.
		(Assoc. Prof.) Yasutaka SHIMOTORI	Stereoselective synthesis of functional organic compounds and evaluation of their properties.
		(Assoc. Prof.) Kazuyuki HATTORI	Synthesis and analysis of biomolecules, especially carbohydrates and carbohydrate polymers.
		(Assoc. Prof.) Kensuke MIYAZAKI	Development of environmentally friendly polymer materials.
Management Engineering	Research and Development System	(Prof.) Fumiko UCHIJIMA	Industry/Academia/Government cooperation, Corporate identity, Public relations
		(Assoc. Prof.) Atsuhiko SAEGUSA	Intellectual property
	Management for Social Implementation	(Prof.) Toru FUJII	Strategic collaborative creation, Technology management, Venture companies, Technology innovation
		(Assoc. Prof.) Yating YU	Methods proposed for employee productivity improvement from the viewpoint of industrial engineering
	International Understanding	(Prof.) Keiichi HOMMA	European politics and culture, US diplomacy. Multicultural society, Information media