

## **FACULTY MEMBERS AND THEIR RESEARCH INTERESTS (Master's Program)**

### **EARTH SCIENCES**

#### **Baba, Sotaro** (Faculty of Education)

Professor, D.Sc., 1998, Osaka City University  
Geology, metamorphic petrology  
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#### **Fujita, Kazuhiko**

Professor, D.Sc., 1999, Tohoku University  
Marine micropaleontology and coral-reef geosciences, paleoenvironmental analysis of Quaternary reef deposits: ecology and paleoecology of large benthic foraminifers  
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Professor, Ph.D., 1990, Kobe University  
Marine and environmental geology, tectonics of the back-arc basin and radiation science of the earth's environment  
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#### **Hisaki, Yukiharu**

Professor, D.Sc., 1996, Tohoku University  
Physical oceanography, the dynamics of ocean currents and ocean waves near the coast, especially, observation and analysis of the ocean using the remotely sensed data and in-situ data  
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#### **Ito, Kosuke**

Associate Professor, Ph.D., 2011, Kyoto University  
Numerical weather prediction, high-impact weather events such as tropical cyclones and local heavy rainfall, data assimilation, atmosphere-ocean coupled system, geophysical fluid dynamics  
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#### **Nakamura, Mamoru**

Professor, D.Sc., 1997, Kyoto University  
Seismology, seismotectonics, crustal structure in island arc, numerical modeling of tsunami  
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#### **Ogata, Takayuki** (Faculty of Education)

Associate Professor, D.Sc., 2005, University of Tsukuba  
Geoscience, geomorphology, environmental science  
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#### **Sentoku, Asuka**

Assistant Professor, Ph.D., 2013, Osaka City University  
Palaeontology, taxonomy, skeletal morphologies of Scleractinia, coral biogeography and microstructure.  
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#### **Shinjo, Ryuichi**

Professor, Ph.D., 1992, Tohoku University  
Igneous petrology, mineralogy and isotope geochemistry  
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**Yamada, Hiroyuki**

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Tropical meteorology, mesoscale meteorology, observations and numerical simulations of precipitation processes associated with disturbances and tropical cyclones

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**CHEMISTRY****Arakaki, Takemitsu**

Professor, Ph.D., 1996, Duke University (U.S.A.)

Environmental chemistry, atmospheric chemistry, analysis of chemical compositions in environmental samples such as atmospheric aerosols and seawater during photochemical processes

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**Arimitsu, Satoru**

Associate Professor, Ph.D., 2008, University of Louisville (U.S.A.)

Organic chemistry

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**Asato, Eiji**

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Coordination chemistry, synthesis of polynuclear transition metal complexes aiming at development of new molecule-based functions. Coordination and cluster chemistry of quinone-based ligands

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**Fujimura, Hiroyuki**

Professor, D.Sc., 2002, University of the Ryukyus

Analytical chemistry, chemical oceanography and carbonate chemistry

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**Nakagawa, Tessui**

Assistant Professor, Ph.D., 2009, Hiroshima University

Material chemistry (hydrogen storage material and ammonia capturing), chemical engineering, inorganic chemistry, and recycle chemistry

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**Ogihara, Kazuhito**

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Organic chemistry, natural product chemistry

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**Shimada, Kojiro**

Assistant Professor, Ph.D., 2013, Tokyo University of Agriculture and Technology (Japan)

Environmental chemistry, atmospheric chemistry, aerosol chemistry, aerosol transformation during long range transport.

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**Suzuka, Toshimasa**

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Organic chemistry, synthetic chemistry

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**Tanaka, Junichi**

Professor, Ph.D., 1990, Osaka University

Marine natural products chemistry, studies on bioactive compounds from marine invertebrates

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**Teruya, Toshiaki** (Faculty of Education)

Professor, D.Sc., 2003, Nagoya University

Natural products chemistry, structure elucidation and evaluation of biological activities of natural products

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**Toki, Tomohiro**

Associate Professor, D. Sc., 2004, Hokkaido University

Geochemistry, cold seeping mechanism, geochemistry of hydrothermal systems, origin and migration of natural gas, formation processes of gas hydrates

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**Yonekura, Nobuaki**

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Biophysical chemistry, development of techniques for environmental virus analysis, microbial fuel cells and gene therapy

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**BIOLOGY****Denda, Tetsuo**

Professor, D.Sc., 1996, Kobe University

Biology, vascular plant phylogeny and evolution in the Ryukyus and adjacent areas

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**Harii, Saki** (Tropical Biosphere Research Center)

Associate Professor, D.Sc., 2001, The University of Tokyo

Marine biology, biology and ecology of marine invertebrates of coral reefs, with special focus on the reproductive biology and symbiosis of reef-building corals

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**Hirose, Euichi**

Professor, D.Sc., 1991, University of Tsukuba

Invertebrate biology: biology of tunicates, morphology, body surface, cell function, photosymbiosis

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**Ikeda, Yuzuru**

Professor, D.Fish. Sc., 1993, Hokkaido University

Biology and aquaculture, learning and communication of cephalopods; laboratory culture of cephalopods

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Marine biology, population genetics of aquatic animals: molecular genetics, crustacean biology

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**Itoh, Ryuuichi**

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Biology, biology of plant organelles (plastids and mitochondria)

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**Kobayashi, Shun**

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Ecology, life history of terrestrial animals on islands, and animal-plant interactions

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**Kubota, Yasuhiro**

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Macroecology, biogeography and community ecology and their application to biodiversity conservation  
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**Kurihara, Haruko**

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Biology, marine environmental science, coral reef biology and ecology, climate change, co-physiology  
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**Morita, Masaya** (Tropical Biosphere Research Center)

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Biology, reproductive biology, cell biology, evolutionary biology  
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**Nakamura, Takashi**

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Biology, ecology and physiology of coral reef organisms, photophysiology of plant-animal symbiosis  
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**Otaki, Joji**

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Biology, molecular physiology, color-pattern formation of butterfly wings, cellular regeneration and development, phenotypic plasticity and evolution, protein structure and function, biological impact of Fukushima nuclear accident  
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**Reimer, James D.**

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Biology, marine invertebrate biodiversity, evolution, phylogenetics and phylogenomics, taxonomy, ecology, symbiont diversity and ecology, marine ecology and conservation, eDNA, historical marine ecology  
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**Sakai, Kazuhiko** (Tropical Biosphere Research Center)

Professor, D.Sc., 1999, Kyushu University  
Ecology, ecology and conservation biology of reef corals including studies of community and population ecology, life-history evolution, sex allocation, and population genetics  
Note: Will teach courses but not take new students.  
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**Suda, Shoichiro**

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**Tachihara, Katsunori**

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Ichthyology, artificial seed production and life history of freshwater and marine fishes  
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**Takemura, Akihiro**

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**Tokuda, Gaku** (Tropical Biosphere Research Center)

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Animal taxonomy, biodiversity, ecology of amphibians  
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Evolutionary biology, evolution and ecology of tropical fishes  
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Biology, biology and biochemistry of active oxygen and nitrogen species  
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Table (Article 5) Master's Program

Course: Chemistry, Biology and Marine Science

FIELD	SUBJECT		CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION		
BIOSCIENCE	REQUIRED	COMMON	Advanced Seminar	6	22.5	1,2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.	All faculty members
		Thesis Research	12	90	1,2	Fall & Spring	For each individual research objective and phase, provide direct instruction and guidance concerning research methods and development.	All faculty members	
	ELECTIVE	SPECIAL	Evolutionary Ecology of Reef Animals I	2	30	1,2	Fall	Reviews and discussions of reproductive strategies, life-history strategies, population dynamics and population genetics of marine organisms, with emphasis on colonial animals.	Sakai, K.
			Advanced Topics in Marine Animal Behavior I	2	30	1,2	Fall	Topics in behavioral studies for marine animals, such as biotelemetry measurement, ethology and comparative psychology. This class deals mainly with cephalopods as a model animals for this field.	Ikeda, Y.
			Advanced Topics in Marine Animal Behavior II	2	30	1,2	Fall	Topics in behavioral studies for marine animals, such as biotelemetry measurement, ethology and comparative psychology. This class deals mainly with cephalopods as a model animals for this field.	Ikeda, Y.
			Advanced Fisheries Biology	2	30	1,2	Fall	Life history and fishing methods of fishes in Japan (sardine, herring, mackerel, yellowtaile, sea bream, flounder, ayu, etc.).	Tachihara, K.
			Plant Phylogeny and Evolution	2	30	1,2	Fall	Recent advances in flowering plant phylogeny and evolution.	Denda, T.
			Life of Tunicates	2	30	1,2	Spring	Introduction to specific features and functions supporting the life of marine invertebrates, dealing with tunicates.	Hirose, E.
			Stress Physiology	2	30	1,2	Spring	Introduction to basic principles of stress physiology, including the production and scavenging mechanisms of active oxygen and active nitrogen in living organisms.	Yamasaki, H.
			Advanced Cell Biology	2	30	1,2	Spring	Current topics in cell biology, with emphasis on the biogenesis of organelles and cytoskeleton.	Itoh, R.
			Advanced Molecular Physiology	2	30	1,2	Spring	Fundamentals of molecular biology, cellular physiology, developmental biology, immunology, and neurobiology. Focuses on mammalian and insect systems.	Otaki, J.
			Advanced Scientific Manuscript Writing	2	30	1,2	Spring	Structure and organization of scientific publications, as well as how to organize and write manuscripts will be discussed. Special attention will be put on logical organization and troublesome grammar points.	Reimer, J. D.
			Advanced Comparative Endocrinology	2	30	1,2	Fall	Endocrine organs and various hormones in vertebrates. Roles of hormones in metabolism, reproduction, and behavior.	Takemura, A.
			Marine Molecular Ecology	2	30	1,2	Fall	Principles and fundamental methods in aquatic animals using molecular and population genetics. Practical method on DNA analysis.	Imai, H.
			Systematic Zoology	2	30	1,2	Spring	Principles and practices of taxonomy, systematics, and phylogenetics of animals, with reference to contemporary discussions on relevant conceptual issues.	Toda, M.
			Responses in Plant Morphogenesis to Environmental Signals	2	30	1,2	Fall	Current topics about the signal cascades of plant morphogenesis caused by environmental signals.	Tanaka, A.
			Animal Evolution and Diversity	2	30	1,2	Fall	Introduction to evolution and diversity in vertebrates.	Tominaga, A.
Advanced Animal Ecology	2	30	1,2	Fall	Overview of animal ecology, animal-plant interaction, and island biology.	Kobayashi, S.			

Table (Article 5) Master's Program

Course: Chemistry, Biology and Marine Science

FIELD	SUBJECT		CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION		
BIOSCIENCE	ELECTIVE	SPECIAL	Advanced Marine Biology	2	30	1,2	Spring	After the revision of basic marine biology concept, the class will discuss about littoral and pelagic ecosystems from major geographic regions (tropical, temperate and polar).	Harii, S.
			Molecular Biochemistry of Plant Biodegradation	2	30	1,2	Fall	Reviews on the current topics in biodegradation of plants with special reference to the mechanisms by which lignocellulolytic enzymes are involved in breakdown of plant cell walls.	Tokuda, G.
			Advanced Evolutionary Ecology	2	30	1,2	Spring	Evolutionary analysis of form and function, life-history, and sexual dimorphism in animals.	Yamahira, K.
			Marine Environmental Biology and Ecology	2	30	1,2	Fall	Overview of current research on marine environmental biology.	Kurihara, H.
			Advanced Coral Reef Ecology	2	30	1,2	Spring	Reviews on current topics in coral reef ecology.	Nakamura, T.
			Advanced Marine Zootaxonomy	2	30	1,2	Spring	Practices of zootaxonomy of marine invertebrates.	Naruse, T.
			Advanced Seminar of Evolutionary Reproductive Biology	2	30	1,2	Spring	Instruction of reproductive biology in terms of evolutionary aspects and practice of analyses with laptop computer.	Morita, M.
			Advanced Plant Taxonomy and Phytogeography	2	30	1,2	Spring	Principles and fundamental methods in plant taxonomy and phytogeography with special reference to the diversity of flowering plants.	Naiki, A.
			Advanced Molecular and Cellular Biology	2	30	1,2	Spring	Topics in organelle dynamics and function. Focuses on single membrane bound organelles such as endoplasmic reticulum, Golgi apparatus, peroxisomes, and lysosomes.	Yagisawa, F.
			Advanced Phycology	2	30	1,2	Fall	Current topics on taxonomy, phylogeny, morphology, genetics, ecology etc. of algae and related organisms.	Suda, S.
			Advanced Plant Ecology	2	30	1,2	Fall	Review of current topics on the maintenance and origin of biodiversity patterns based on taxonomic, functional and phylogenetic properties.	Kubota, Y.
			Basics of Symbiosis	2	30	1,2	Spring	Introduction of current topics about the relationship between corals and algae.	Takahashi, S.

Requirements for course completion:

Students must obtain a total of 30 or more credits including 6 credits from Advanced Seminar and 12 credits from Thesis Research on Bioscience Field. In addition to receiving the necessary instruction, the student must also receive a passing grade on final examinations and Master's thesis.

Remarks regarding the following subjects:

Credits for Advanced Seminar are earned over 2 years (3 credits received per year).

Credits for Thesis Research are earned over 2 years (6 credits received per year).

Table (Article 5) Master's Program

Course: Chemistry, Biology and Marine Science  
Physics and Earth Sciences

FIELD	SUBJECT		CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION		
	REQUIRED	COMMON							
ENVIRONMENTAL SCIENCE	REQUIRED	Advanced Seminar	6	22.5	1,2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.	All faculty members	
		Thesis Research	12	90	1,2	Fall & Spring	For each individual research objective and phase, provide direct instruction and guidance concerning research methods and development.	All faculty members	
	ELECTIVE	SPECIAL	Topics on Marine Chemical Ecology	2	30	1,2	Spring	Chemicals involved in the ecology of marine organisms will be reviewed.	Tanaka, J.
			Introduction to Atmospheric Chemistry	2	30	1,2	Spring	This course provides an overview of atmospheric chemistry and a working knowledge of the critical issues that atmospheric chemists face today.	Arakaki, T.
			Environmental Analytical Chemistry I	2	30	1,2	Spring	This course deals with qualitative and quantitative analytical chemistry, especially principles and procedures of chemical analyses of environmental water sample.	Fujimura, H.
			Practical Skills in Presentation, Publication and Patent Application	2	30	1,2	Spring	Learning and training presentation/writing skills for research outputs such as: (1) oral presentation at conference (2) poster presentation at conference (3) patent search and submission (4) scientific paper	Nakagawa, T.
			Introduction to Natural Product Chemistry	2	30	1,2	Spring	This course deals with isolation, structure determination and biological activities of natural products.	Teruya, T.
			Advanced Environmental Analytical Chemistry	2	30	1,2	Fall or Spring	Lectures on air pollution will be given on the characteristics of air pollutants that affect climate change and our health.	Shimada, K.
			Advanced Crustal Hydrosphere Geochemistry	2	30	1,2	Spring	Reviews of geochemical studies about fluids and gasses beneath the seafloor.	Toki, T.
			Biochemistry of Metal Ions	2	30	1,2	Spring	Lecture on roles of metal ions in biology.	Asato, E.
			Advanced Stereochemistry	2	30	1,2	Fall	This lecture will be about basic knowledge and information how to control stereochemistry on organic reactions.	Arimitsu, S.
			Molecular Spectroscopy I	2	30	1,2	Spring	Spectroscopies to characterize molecular properties and the applications in biophysical chemistry.	Yonekura, N.
			Advanced Ocean Remote Sensing I	2	30	1,2	Spring	Principles of ocean remote sensing such as radiometer, scatterometer and altimeter. Applications of ocean remote sensing to physical oceanography.	Hisaki, Y.
			Advanced Ocean Remote Sensing II	2	30	1,2	Spring	Principles of ocean remote sensing such as radiometer, scatterometer and altimeter. Applications of ocean remote sensing to physical oceanography.	Hisaki, Y.
			Advanced Meteorology I	2	30	1,2	Fall	Lecture on basic theory and recent advances of atmospheric sciences, including the evolution and structure of precipitating cloud systems in the tropical and subtropical regions.	Yamada, H.
			Advanced Meteorology II	2	30	1,2	Spring	Lecture on basic theory and recent advances of atmospheric sciences, including the evolution and structure of precipitating cloud systems in the tropical and subtropical regions.	Yamada, H.
			Advanced Numerical Weather Prediction I	2	30	1,2	Fall	Fundamentals on numerical weather prediction, including basic equations, computer programming, and performing idealized and real through experiments.	Itoh, K.
			Advanced Numerical Weather Prediction II	2	30	1,2	Spring	Fundamentals on numerical weather prediction, including data analysis, forecast errors, and data assimilation.	Itoh, K.
			Advanced Metamorphic Petrology I	2	30	1,2	Fall	Petrogenesis and dynamics of metamorphic rocks and its geotectonic implications.	Baba, S.
			Advanced Metamorphic Petrology II	2	30	1,2	Spring	Petrogenesis and dynamics of metamorphic rocks and its geotectonic implications.	Baba, S.



Table (Article 5) Master's Program

FIELD	SUBJECT		CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION		
ENVIRONMENTAL SCIENCE	ELECTIVE	SPECIAL	Advanced Geomorphology I	2	30	1,2	Fall	Principles and applications of geomorphological processes such as weathering, erosion, transportation and sedimentation.	Ogata, T.
			Advanced Geomorphology II	2	30	1,2	Spring	Principles and applications of geomorphological processes such as weathering, erosion, transportation and sedimentation.	Ogata, T.
			Advanced Geochemistry I	2	30	1,2	Fall	Isotopic and trace element geochemistry of igneous rocks and its geotectonic implications.	Shinjo, R.
			Advanced Geochemistry II	2	30	1,2	Spring	Isotopic and trace element geochemistry of igneous rocks and its geotectonic implications.	Shinjo, R.
			Crustal Movement Monitoring I	2	30	1,2	Fall	Basic theory for the monitoring of crustal movement, volcanic activity, earthquake, etc., based on radiation science and geomagnetism.	Furukawa, M.
			Crustal Movement Monitoring II	2	30	1,2	Spring	Basic theory for the monitoring of crustal movement, volcanic activity, earthquake, etc., based on radiation science and geomagnetism.	Furukawa, M.
			Advanced Seismology I	2	30	1,2	Fall	This course constitutes an overview of observational and theoretical seismology and the utilization of seismic waves for the study of the earth's interior. Topics include elastic wave propagation, seismic ray theory, interpretation of travel times, surface wave, and seismic tomography.	Nakamura, M.
			Advanced Seismology II	2	30	1,2	Spring	This course constitutes an overview of observational and theoretical seismology and the utilization of seismic waves for the study of the earth's interior. Topics include elastic wave propagation, seismic ray theory, interpretation of travel times, surface wave, and seismic tomography.	Nakamura, M.
			Coral Reef Earth Science I	2	30	1,2	Fall	Lecture on recent advances and topics on earth sciences related to coral reefs, which include geomorphology, geology, geohistory, paleontology, carbonate sedimentology, paleoceanography, environmental sciences, and geocotechnology.	Fujita, K.
			Coral Reef Earth Science II	2	30	1,2	Spring	Lecture on recent advances and topics on earth sciences related to coral reefs, which include geomorphology, geology, geohistory, paleontology, carbonate sedimentology, paleoceanography, environmental sciences, and geocotechnology.	Fujita, K.
			Earth History and Palaeontology I	2	30	1,2	Fall	This lecture will help you develop key knowledge and research skills in the field of earth history and palaeontology. Lecture on basic training in earth sciences, with a specialisation in stratigraphy and palaeontology.	Sentoku, A.
			Earth History and Palaeontology II	2	30	1,2	Spring	This lecture will help you develop key knowledge and research skills in the field of earth history and palaeontology. Lecture on basic training in earth sciences, with a specialisation in stratigraphy and palaeontology.	Sentoku, A.

## Requirements for course completion:

Students must obtain a total of 30 or more credits including 6 credits from Advanced Seminar and 12 credits from Thesis Research on Environmental Science Field. In addition to receiving the necessary instruction, the student must also receive a passing grade on final examinations and Master's thesis.

Remarks regarding the following subjects:

Credits for Advanced Seminar are earned over 2 years (3 credits received per year).

Credits for Thesis Research are earned over 2 years (6 credits received per year).