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

EARTH SCIENCES

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Geology, metamorphic petrology
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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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CHEMISTRY

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BIOLOGY

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2026 SUBJECTS (Science)

G-OCEANS (Global-Okinawa Climate change & Ecosystems: Advanced Next-generation Sciences Program)

Table (Article 10) Master's Program

Course: Chemistry, Biology and Marine Science

FIELD	SUBJECT		Subject Code	SUBJECT	CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION
BIOSCIENCE	REQUIRED	COMMON	ESSP11010	Advanced Seminar Ⅰ	1.5	22.5	1	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP11020	Advanced Seminar Ⅱ	1.5	22.5	1	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP13010	Advanced Seminar Ⅲ	1.5	22.5	2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP13020	Advanced Seminar Ⅳ	1.5	22.5	2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP11030	Thesis Research Ⅰ	3	90	1	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP11040	Thesis Research Ⅱ	3	90	1	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP13030	Thesis Research Ⅲ	3	90	2	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP13040	Thesis Research Ⅳ	3	90	2	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
	ELECTIVE	COMMON	ESSP13090	International Field Course	2	30	1,2	Spring	Field and laboratory work at field stations to learn techniques of marine and environmental sciences related to G-OCEANS program.
			ESSP13120	Cross-Disciplinary Seminar	2	30	1,2	Fall	Students will learn how to plan, organize, manage, open, and run a small conference.
		SPECIAL	ESBI13160	Advanced Topics in Marine Animal Behavior	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.
			ESBI13020	Plant Phylogeny and Evolution	2	30	1,2	Fall	Recent advances in flowering plant phylogeny and evolution.
			ESBI13090	Life of Tunicates	2	30	1,2	Spring	Introduction to specific features and functions supporting the life of marine invertebrates, dealing with tunicates.
			ESBI13080	Advanced Cell Biology	2	30	1,2	Spring	Current topics in cell biology, with emphasis on the biogenesis of organelles and cytoskeleton.
			ESBI13100	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.
			ESBI13310	Advanced Ichthyology	2	30	1,2	Fall	Recent advances in fish research will be introduced. Students will also introduce research papers or books in a seminar format.

FIELD	SUBJECT		Subject Code	SUBJECT	CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION
BIOSCIENCE	ELECTIVE	SPECIAL	ESBI13130	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.
			ESBI13170	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.
			ESBI13200	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.
			ESBI13050	Animal Evolution and Diversity	2	30	1,2	Fall	Introduction to evolution and diversity in vertebrates.
			ESBI13060	Advanced Animal Ecology	2	30	1,2	Fall	Overview of animal ecology, animal-plant interaction, and island biology.
			ESBI13220	Advanced Marine Biology	2	30	1,2	Fall	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).
			ESBI13230	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.
			ESBI13210	Advanced Evolutionary Ecology	2	30	1,2	Spring	Evolutionary analysis of form and function, life-history, and sexual dimorphism in animals.
			ESBI13040	Marine Environmental Biology and Ecology	2	30	1,2	Fall	Overview of current research on marine environmental biology.
			ESBI13030	Advanced Coral Reef Ecology	2	30	1,2	Fall	Reviews on current topics in coral reef ecology.
			ESBI13240	Advanced Marine Zootaxonomy	2	30	1,2	Spring	Practices of zootaxonomy of marine invertebrates.
			ESBI13250	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.
			ESBI13260	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.
			ESBI13110	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.
			ESBI13290	Basics of Symbiosis	2	30	1,2	Spring	Introduction of current topics about the symbiotic relationship between corals and algae.
			ESBI13300	Advanced Biodiversity and Evolution Sciences	2	30	1,2	Fall	Overview of current research on evolution and biodiversity, focusing mainly on molecular phylogeny and population genetics.
			ESBI13320	Methodology for Field Ecology	2	30	1,2	Fall	Students will learn statistical sampling techniques to detect patterns in biological communities in the field. Intended for beginners.

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.

2026 SUBJECTS (Science)

G-OCEANS (Global-Okinawa Climate change & Ecosystems: Advanced Next-generation Sciences Program)

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

Table (Article 10) Master's Program

FIELD	SUBJECT		Subject Code	SUBJECT	CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION
ENVIRONMENTAL SCIENCE	REQUIRED	COMMON	ESSP11050	Advanced Seminar Ⅰ	1.5	22.5	1	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP11060	Advanced Seminar Ⅱ	1.5	22.5	1	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP13050	Advanced Seminar Ⅲ	1.5	22.5	2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP13060	Advanced Seminar Ⅳ	1.5	22.5	2	Fall & Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			ESSP11070	Thesis Research Ⅰ	3	90	1	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP11080	Thesis Research Ⅱ	3	90	1	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP13070	Thesis Research Ⅲ	3	90	2	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
			ESSP13080	Thesis Research Ⅳ	3	90	2	Fall & Spring	For each individual research objective and phase, provide guidance concerning research methods and development.
	ELECTIVE	COMMON	ESSP13100	International Field Course	2	30	1,2	Spring	Field and laboratory work at field stations to learn techniques of marine and environmental sciences related to G-OCEANS program.
			ESSP13130	Cross-Disciplinary Seminar	2	30	1,2	Fall	Students will learn how to plan, organize, manage, open, and run a small conference.
		SPECIAL	ESCH11140	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.
			ESCH11090	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.
			ESCH11110	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
			ESCH11150	Introduction to Natural Product Chemistry	2	30	1,2	Spring	This course deals with isolation, structure determination and biological activities of natural products.
			ESCH13020	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.
			ESCH13010	Advanced Crustal Hydrosphere Geochemistry	2	30	1,2	Spring	Reviews of geochemical studies about fluids and gasses beneath the seafloor.
			ESCH11120	Catalytic Chemistry	2	30	1,2	Spring	This course describes the preparation methods, basic theories, and latest topics of catalysts used in chemical reactions that cause energy conversion between electrical and chemical energy.
			ESCH11060	Advanced Stereochemistry	2	30	1,2	Fall	This lecture will be about basic knowledge and information how to control stereochemisty on organic reactions.
			ESCH11010	Molecular Spectroscopy Ⅰ	2	30	1,2	Spring	Spectroscopies to characterize molecular properties and the applications in biophysical chemistry.

2026 SUBJECTS (Science)

G-OCEANS (Global-Okinawa Climate change & Ecosystems: Advanced Next-generation Sciences Program)

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

Table (Article 10) Master's Program

FIELD	SUBJECT		Subject Code	SUBJECT	CREDITS	HOURS	YEARS	SEMESTERS	SUBJECT DESCRIPTION
ENVIRONMENTAL SCIENCE	ELECTIVE	SPECIAL	ESEA13130	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.
			ESEA13140	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.
			TO BE CONFIRMED	Numerical Weather Prediction Ⅰ	2	30	1,2	Fall	Acquire knowledge of numerical weather prediction and its applications through series of lectures and seminars.
			TO BE CONFIRMED	Numerical Weather Prediction Ⅱ	2	30	1,2	Spring	Acquire knowledge of numerical weather prediction and its applications through series of lectures and seminars.
			ESEA13210	Advanced Climate Dynamics Ⅰ	2	30	1,2	Fall	Acquire knowledge of climate changes from past to the future and their dynamics through series of lectures and seminars.
			ESEA13220	Advanced Climate Dynamics Ⅱ	2	30	1,2	Spring	Acquire knowledge of climate changes from past to the future and their dynamics through series of lectures and seminars.
			ESEA13090	Advanced Metamorphic Petrology Ⅰ	2	30	1,2	Fall	Petrogenesis and dynamics of metamorphic rocks and its geotectonic implications.
			ESEA13100	Advanced Metamorphic Petrology Ⅱ	2	30	1,2	Spring	Petrogenesis and dynamics of metamorphic rocks and its geotectonic implications.
			ESEA13110	Advanced Geomorphology Ⅰ	2	30	1,2	Fall	Principles and applications of geomorphological processes such as weathering, erosion, transportation and sedimentation
			ESEA13120	Advanced Geomorphology Ⅱ	2	30	1,2	Spring	Principles and applications of geomorphological processes such as weathering, erosion, transportation and sedimentation
			ESEA13030	Advanced Geochemistry Ⅰ	2	30	1,2	Fall	Isotopic and trace element geochemistry of igneous rocks and its geotectonic implications.
			ESEA13040	Advanced Geochemistry Ⅱ	2	30	1,2	Spring	Isotopic and trace element geochemistry of igneous rocks and its geotectonic implications.
			ESEA13050	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.
			ESEA13060	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.
			ESEA13070	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.
			ESEA13080	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.

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.