FACULTY MEMBERS AND THEIR RESEARCH INTERESTS (Doctoral Program)

EARTH SCIENCES

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BIOLOGY

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2022 SUBJECTS (Science)

LA MER (Leadership for ASEAN Marine Environments and Resources Program)

Table (Article 10) Doctoral Program

Course：Marine and Environmental Sciences

FIELD	SUBJECT			CREDITS	HOURS	YEARS	Subject Code	SEMESTERS	SUBJECT DESCRIPTION
	REQUIRED	COMMON	Advanced Special Seminar	2	30	1–3	ESME25010	Fall/ Spring	Present and discuss research information such as original academic papers, as well as research plans and findings, in a seminar format.
			Advanced Special Exercise	2	60	1–3	ESME25020	Fall/ Spring	For each individual research objective and phase, provide direct instruction and guidance concerning research methods and development.
BIOSCIENCE	ELECTIVE	SPECIAL	Fish and Shellfish Molecular Population Genetics	2	30	1–3	ESME25240	Fall	Genetic species identification of fish and shellfish, existence of cryptic species, exploration of genetic markers for stock identification, study method for aquatic organisms will be presented and discussed. How to write dissertation will be instructed.
			Cephalopod Behavior	2	30	1–3	ESME25210	Fall	Various aspects of behavioral characteristics in cephalopods. These include learning, memory, sociality, and reproductive behavior in octopus, squid and cuttlefish. This class tries to learn how intelligent these creatures (cephalopods) are.
			Reproductive Physiology	2	30	1–3	ESME25220	Spring	Physiological and behavioral mechanisms of reproductive events in low vertebrates. Special attention is paid to endocrine regulation of respective function.
			Advanced Marine Ecology	2	30	1–3	ESME25340	Fall	Reviews and discussions of recent topics in ecology of coral reef organisms with emphasis on responses of the organisms to climate change.
			Freshwater Biology	2	30	1–3	ESME25260	Spring	Life historical characteristics of freshwater fishes (primary freshwater fish, amphidromous fish, catadoromous fish) in the Ryukyu Archipelago.
			Plant Molecular Phylogeny	2	30	1–3	ESME25140	Spring	Discussion of current topics in molecular phylogeny and evolution of vascular plants.
			Plant Molecular Biology	2	30	1–3	ESME25150	Fall	Current topics in molecular genetics, genome science, genetic engineering, and bioimaging techniques, mainly focusing on plants.
			Oxygen Biology	2	30	1–3	ESME25120	Fall	Comprehensive review on biochemistry and biology of reactive oxygen (ROS) and nitrogen species (RNS).
			Microscopic Structures of Body Surfaces and Their Functions	2	30	1–3	ESME25130	Fall	Microscopic structures of the body surface of marine invertebrates and the approaches to reveal their properties and functions.
			Developmental Physiology	2	30	1–3	ESME25160	Spring	Molecular and cellular aspects of mammalian and insect developmental systems.
			Species Biology	2	30	1–3	ESME25360	Fall	Discussion and presentation about the definition, identification and characteristics of ″species″.
			Evolutionary Biology of Tropical Organisms	2	30	1–3	ESME25370	Fall	Discussion about evolutionary mechanisms that create biodiversity in the tropics.
			Organelles and Cell Physiology	2	30	1–3	ESME25180	Spring	Topics in physiological aspects of organella dynamics and function. Focuses on organelle–related diseases, aging, and cell differentiation.
			Vertebrate Systematics and Evolutionary Biology	2	30	1–3	ESME25190	Fall	Discussion and presentation about evolution and divergence processes in vertebrates.
			Molecular Enzymology of Plant Degradation	2	30	1–3	ESME25390	Fall	Reviews on the recent advances on molecular machinery and classifications of enzymes involved in biodegradation of plant cell walls.
			Evolutionary Anthropology	2	30	1–3	ESME25170	Spring	Review of evolutionary histories of human: genetics, extant primates, fossils, culture, and society.
	ELECTIVE	SPECIAL	Ecology of Tropical Coasts	2	30	1–3	ESME25380	Spring	Review on current topics of tropical coastal ecology, including coral reefs and discussion on environmental issues.
			Advanced Seminar of Reproductive Biology	2	30	1–3	ESME25350	Fall	Seminar and laboratory work on reproductive biology.
			Biodiversity study	2	30	1–3	ESME25460	Spring	The term biodiversity refers to a concept that indicates diversities related to living organisms on earth. This class will debate about selected biodiversity–related researches and reviews.
			Advanced Marine Environmental Biology	2	30	1–3	ESME25320	Fall	Review, presentation and discussion of current topics related to marine environment including climate change effects on marine organisms and ecosystems.
			Plant Reproductive Ecology	2	30	1–3	ESME25400	Fall	Review on recent progress of plant reproductive biology, including the basics of gender expression, pollination and phenology.
			Global Change Biology	2	30	1–3	ESME25470	Spring	Introduction of current topics about the response of corals to global warming.

2022 SUBJECTS (Science)

LA MER (Leadership for ASEAN Marine Environments and Resources Program)

Table (Article 10) Doctoral Program

Course：Marine and Environmental Sciences

FIELD			SUBJECT	CREDITS	HOURS	YEARS	Subject Code	SEMESTERS	SUBJECT DESCRIPTION
ENVIRONMENTAL SCIENCE	ELECTIVE	SPECIAL	Applied Phycology	2	30	1–3	ESME25200	Fall	Discussion and presentation about recent and advanced phycological studies especially in applied phycology.
			Advanced Ecology	2	30	1–3	ESME25250	Fall	Review of current topics on the maintenance and origin of biodiversity patterns based on taxonomic, functional and phylogenetic properties.
			Advanced Ecology of Coral Reef Organisms	2	30	1–3	ESME25270	Fall	Review, presentation and discussion about coral reef organisms and related research fields.
			Advanced Environmental Chemistry	2	30	1–3	ESME21020	Spring	This course provides an overview of chemical reactions occurring in aquatic environment. In particular, this course deals with photochemical reactions caused by sunlight.
			Carbonate Geochemistry	2	30	1–3	ESME23010	Spring	This course deals with carbonates in lithosphere and hydrosphere, especially natural mechanism of CO_2 absorption from atmosphere in the global carbon cycles and its role in coral reefs.
			Advanced Asymmetric Organic Reaction	2	30	1–3	ESME25330	Fall	This lecture will be about synthetic strategies for asymmetric organic reactions icluding catalysis.
			Advanced Marine Environmental Chemistry	2	30	1–3	ESME25110	Fall & Spring	Chemical processes in marine environments.
			Organic Structural Spectroscopy	2	30	1–3	ESME25280	Spring	Spectroscopic methods to analyze the structures of organic molecules will be reviewed.
			Spectrometric Analysis of Organic Compounds	2	30	1–3	ESME25300	Fall	Spectroscopic methods for structure analysis such as mass spectrometry, nuclear magnetic resonance spectroscopy and infrared spectroscopy.
			Advanced Ocean Wave Remote Sensing	2	30	1–3	ESME25070	Fall & Spring	Physics of ocean surface waves, principle of ocean wave remote sensing and application of ocean wave remote sensing to physical oceanography.
			Tropical Meteorology	2	30	1–3	ESME25080	Fall	This course provides fundamental knowledge of about tropical atmosphere, including energy balance, atomospheric structure and circulation, tropical cyclone, and intraseasonal variability.
			Advanced Data Assimilation	2	30	1–3	ESME25100	Fall	Data assimilation synthesizes the results of mathematical model with observations.In this lecture, Kalman filter, 4D-Var and particle filter are explainedthrough lecture and exercise.
			Environmental Tectonics	2	30	1–3	ESME25030	Fall & Spring	Basics and application on the environmental changes related to crustal movement, weathering process, material circulation, sea-level change, etc..
			Igneous Petrology and Geochemistry	2	30	1–3	ESME25040	Fall & Spring	Reviews and discussion about trace elements and isotopic composition of environmental Earth materials.
			Geodynamics	2	30	1–3	ESME25050	Fall	This course deals with mechanics of deformation of the crust and mantle. Geological areas of application include earthquakes and tsunamis, tectonic plate flexure, and upper mantle flow and deformation.
			Coral-reef Biogeoscience	2	30	1–3	ESME25090	Fall	A seminar to study topics and terms on multidisciplinary research on biogeosciences related to coral reefs in the present and past.
			Crustal Evolution	2	30	1–3	ESME25060	Fall	This unit of study provides an introduction to crustal evolution process from the point of views of petrologenesis of metamorphic rock and its geochronology.
			Advanced Biodiversity of Marine Invertebrates	2	30	1–3	ESME25230	Spring	Discussion of marine biodiversity, historical and modern problems in its estimation, and varying concepts of species and methodologies to detect and count them.
	ELECTIVE	COMMON	International Field Course	2	30	1–3	ESME25480	Spring	Field and laboratory work at field stations to learn techniques of marine and environmental sciences related to LA MER program.
			Special Lecture A	2	30	1–3	ESME25420	Intensive	Course on marine and environmental sciences.
			Special Lecture B	2	30	1–3	ESME25430	Intensive	Course on marine and environmental sciences.
			Special Lecture C	2	30	1–3	ESME25440	Intensive	Course on marine and environmental sciences.
			Special Lecture D	2	30	1–3	ESME25450	Intensive	Course on marine and environmental sciences.

Requirements for course completion:
Students must obtain a total of 12 or more credits including 2 credits from Advanced Special Seminar and 2 credits from Advanced Special Exercise. In addition to receiving the necessary instruction, the student must also receive a passing grade on final examinations and Doctoral dissertation.