



Environmental/Marine Science Program
Student Learning Outcome Mapping
Course (CLO), Program (PLO), Institutional (ILO)

Program Description: This program provides technical knowledge, skills and proper work habits/attitudes necessary for employment in this field. It also provides the option for employees in this field to improve their skills, and for pursuit of a higher education in the field of environmental/marine science.

Program Learning Outcomes	Institutional Learning Outcomes
<ol style="list-style-type: none"> 1. Students will apply scientific methods and technical laboratory skills. 2. Students will apply field techniques. 3. Students will conduct individual and team research. 	<ol style="list-style-type: none"> 1. Critical Thinking and Problem Solving: Analyze and solve problems by using informed judgment based on evidence, sound reasoning, and/or creativity to differentiate facts from opinions and to specify solutions and their consequences. 2. Communication: Effectively communicate, both orally and in writing, thoughts in a clear, well-organized manner to persuade, inform and/or convey ideas in academic, work, family and community settings. 3. Quantitative and Technological Competence: Use mathematical skills appropriate to our technological society by analyzing and solving problems that are quantitative in nature and use technology for informational, academic, personal and professional needs. 4. Diversity: Understand and appreciate differences in cultures and behaviors between the self and others by demonstrating respect, honesty, fairness, and ethical principles in both personal and professional life. 5. Civic Responsibility: Apply the principles of civility and morality to situations in the contexts of a healthy family, work, community, environment and world. 6. Aesthetics: Apply numerous means of inquiry to experience and appreciate the values of arts and nature.

PLO-ILO Mapping

PLOs	ILOs					
	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
PLO 1	X	X	X	X	X	X
PLO 2	X	X	X	X	X	X
PLO 3	X	X	X	X	X	X

CLO-PLO-ILO Mapping

SC 109 - Principles of Biology I

This is the first semester of a two semester course that covers cells and molecular biology, generics, evolution, and the origin and history of life on earth.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. Describes all eight characteristics of living things.			X	X	X	X			
2. Describes all four groups of biological molecules.		X		X	X	X			
3. Describe the seven major structures and functions of the plasma membrane.		X		X	X	X			
4. Identify a function of each of the different structures found in cells and state whether each would be found in prokaryotic, plant, or animal cells.	X			X	X	X			
5. Describe five major reactions of photosynthesis.	X	X		X	X	X			
6. Describe the evidence for DNA being the genetic material, how the molecular structure of DNA was worked out, and how DNA is copied, packaged and organized into chromosomes.	X			X	X	X			

SC 110 - Principles of Biology II

This is the second of a two-semester course that covers the classification, diversity, structure, physiology, and ecology of living organisms.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. Explain the five kingdom system of classification.	X			X	X	X			
2. Compare eukaryotic and prokaryotic microorganisms.	X			X	X	X			
3. Identify the major groups of plants.	X			X	X	X			
4. Examine specimens in the Kingdom Plantae.	X	X	X	X	X	X			
5. Distinguish the major groups in the Kingdom Animalia.	X			X	X	X			
6. Examine specimens in the Kingdom Animalia.	X	X	X	X	X	X			

SC 119 - Introduction to Physical Science

This course provides students with an introduction to the physical sciences beginning with physics and studies of measurement, motion, gravity, energy, electricity, and magnetism. Chemistry covers fundamentals of matter, atomic theory, and the periodic table. Earth Science includes geologic evolution of the planet, environmental geology and astronomy.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. SCIENTIFIC INVESTIGATION: Develop abilities that are necessary to properly conduct scientific investigations, gather and analyze data, and present findings in a formal written report.	X	X		X	X	X			
2. SCIENTIFIC MEASUREMENTS: Acquire quantitative data from laboratory and field procedures to describe dimensional objects or events.	X	X		X	X	X			
3. SCIENTIFIC KNOWLEDGE: Integrate, analyze, and apply all of the basic scientific concepts and principles of physical science in the areas of physics, chemistry, and geology.	X	X		X	X	X			
4. CRITICAL THINKING: Demonstrate the ability to use process skills, critical thinking, scientific reasoning and strategies to investigate and solve problems in a variety of scientific, technological, environmental and everyday contexts.			X	X	X	X			

SC 120 - Physical Geology

This course is intended to provide students with a sound understanding of the basic processes of geology. Topics include the origin, composition, and structure of the earth, internal processes and plate tectonics, weathering and soil, and surface processes.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. Knowledge on the basic concepts of physical geology – Demonstrate competency in the basic concepts of physical geology by providing concise explanations and engaging in lively discussions about the way geology affects our planet and our lives.	X	X	X	X	X	X			

SC 160 - General Chemistry I

This course is the first part of a two-semester course that covers fundamental principles in chemistry. This course provides the beginning student with an adequate foundation in the fundamentals of chemistry. Topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, solutions, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, and an introduction to thermodynamics. Laboratory investigations are an integral part of this course and reinforce fundamental principles of general chemistry, introduction of the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports.

CLO Students will be able to:	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. KNOWLEDGE IN GENERAL CHEMISTRY – Gain knowledge in the fundamental concepts and principles in chemistry including, but not limited to, classification of matter, formation of molecules and ions, nomenclature, stoichiometry, thermochemistry, electronic structure, bonding, and molecular geometry.	X	X	X	X	X	X			
2. SCIENTIFIC INQUIRY – Demonstrate the ability to incorporate the proper investigative protocols, select the most appropriate instruments to increase experimental data precision and accuracy, enforce safety regulations, and demonstrate professional affective skills when conducting scientific experiments or investigations to solve a problem or identify the best solution(s) to a problem.	X	X	X	X	X	X			
3. SCIENTIFIC REPORT WRITING – Demonstrate the ability to communicate findings of scientific investigations in formal written scientific reports.	X	X	X	X	X	X			

SC 161 - General Chemistry II

This course is the second part of a two-semester course that covers fundamental principles in chemistry. This course provides the beginning student with an adequate foundation in the fundamentals of chemistry. Topics include, to some details, properties of gases, liquids, and solutions, chemical kinetics, chemical equilibria, descriptive inorganic chemistry, and an introduction to organic chemistry and biochemistry of the four major macromolecules in human body. Laboratory investigations are an integral part of this course and reinforce fundamental principles of general chemistry, introduction of the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports.

CLO Students will be able to:	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. KNOWLEDGE IN GENERAL CHEMISTRY – Gain knowledge in the fundamental concepts and principles in chemistry including, but not limited to, properties of gas, liquid, and solid substances, intermolecular forces, solution formation and the energy involved in the dissolution process, determination of acids and bases, pH and pOH value calculations, entropy and free energy involved in spontaneous processes, chemical equilibrium and factors that influences the rate of chemical reaction, nomenclature of organic molecules, and chemical structure of living matter.	X	X	X	X	X	X			
2. SCIENTIFIC INQUIRY – Demonstrate the ability to incorporate the proper investigative protocols, select the most appropriate instruments to increase experimental data precision and accuracy, enforce safety regulations, and demonstrate professional affective skills when conducting scientific experiments or investigations to solve a problem or identify the best solution(s) to a problem.	X	X	X	X	X	X			
3. SCIENTIFIC REPORT WRITING – Demonstrate the ability to communicate findings of scientific investigations in formal written scientific reports.	X	X	X	X	X	X			

SC 190 - Introduction to Marine Science

The purpose of this course is to provide an overview of the marine environment. It introduces general theory and principles in marine science covering the biological, chemical, geological and physical characteristics of the marine environment. Laboratory investigations of selected topics in the course content, which also include the use of scientific method, measurement, laboratory apparatus, and safety procedures, are an integral part of this course.

CLO Students will be able to:	PLO				ILO					
	PLO 1	PLO 2	PLO 3		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. KNOWLEDGE IN PHYSICAL OCEANOGRAPHY – Demonstrate the knowledge of basic physical oceanography concepts.	X	X	X		X	X	X	X		X
2. KNOWLEDGE IN MARINE BIOLOGY – Demonstrate the knowledge of basic marine biology concepts.	X	X			X	X	X	X		X
3. SCIENTIFIC INVESTIGATION – Design an experiment to investigate a marine habitat and able to determine appropriate scientific techniques in field investigations to answer a question, gather and analyze data, and report findings.	X		X		X	X	X	X		X
4. RESEARCH SKILLS (WRITTEN COMMUNICATION) – Actively learn outside of the classroom and demonstrates ability to conduct research.	X	X			X	X	X	X		X
5. KNOWLEDGE SHARING (ORAL COMMUNICATION), and/or KNOWLEDGE APPLICATION – Share knowledge to diverse audience presenting results of investigation to a local audience and engages in community activities to promote awareness of the research and/or other marine science issues at the local level.			X		X	X	X	X		X

SC 239 - Natural History of Palau

This course is about the natural environment of Palau. It introduces the student to the geological formation of the islands of Palau, the significance of oceanic distance between Palau islands and its neighboring islands and continents, and how it influences migration and immigration of terrestrial and marine organisms between islands. Students will better understand and develop appreciation of the importance of the major terrestrial and marine ecosystems to Palau's environment and culture. Students become aware of how island ecosystems function, and more importantly, how they are all interconnected. Through field observations, students gain knowledge and skills in identifying, by their scientific names, of some of the common terrestrial and marine flora and fauna of Palau. Students become aware of the richness of Palau's biodiversity by participating in simple field surveys and monitoring techniques. Through library research, online searches using search engines, and interviews with local experts, students increase their knowledge of some of Palau's indigenous, introduced, and endemic species. Students construct public education awareness power point presentations on selected flora and fauna of Palau, proposing practical solutions to conserve and protect Palau's biodiversity, and present to their peers.

CLO Students will be able to:	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. KNOWLEDGE OF THE NATURAL ENVIRONMENT OF PALAU – Be literate and demonstrate familiarity of the natural environment of Palau, its geological formation, ecosystems, and indigenous, endemic, endangered, and invasive flora and fauna that inhabits the islands.	X		X	X	X	X	X		X
2. RESEARCH SKILLS – Actively learn outside of the classroom through library research, local interviews, and search using different internet search engines.	X	X	X	X	X	X	X		X
3. KNOWLEDGE SHARING – Share knowledge to diverse audience by preparing and presenting a community awareness presentation of a local environmental issue to a local audience; student engages in community activities to experience possible solutions to local and global problems.		X	X	X	X	X	X		X

SC 249 - Environmental Concepts and Issues

This course introduces students to fundamental ecological concepts, how we interact with the Earth, and how we deal with environmental problems we face. Lectures and assignments give overviews of the major ecosystems on Pacific islands, their values, and environmental threats in the 21st century including global climate change, biodiversity, land use, waste management, and sustainability of resources. This course involves developing skill to analyze information and ideas, judge their validity and reliability, and make decisions. Students are required to apply critical thinking skills to distinguish between facts and opinions, evaluate evidence and arguments, take and defend informed positions on issues (local, regional, & global), integrate information and see relationships, and apply knowledge to dealing with new and different problems, and our lifestyle choices. Students will be required to undertake a research project and write a scientific research paper using the present MLA writing guidelines.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. KNOWLEDGE: Be literate and conversant of the basic concepts of ecology, structure of a natural ecosystem, interrelatedness within an ecosystem and between ecosystems, the influences of human practices on our island ecosystems, renewable and nonrenewable resources, and sustainability of resources.	X	X		X	X	X	X	X	X
2. CONSTRUCTING AN ARGUMENT: Analyze and examine multiple perspectives of an environmental issue; creatively craft an opinion on the issue applying logic, wit, and skillfully present evidences that influence the audience's thinking and changes their minds or prompt some action.	X			X	X	X	X	X	
3. RESEARCH SKILLS: Actively learn outside of the classroom through library research and field projects.			X	X	X		X	X	
4. KNOWLEDGE APPLICATION AND SHARING: Share knowledge to diverse audience by preparing and presenting a community awareness presentation of a local environmental issue to a local audience; student engages in community activities to experience possible solutions to local and global problems.		X	X	X	X		X	X	X

SC 270 - Field Studies

This course covers the application of commonly used ecological surveying techniques. Students will learn the use of commonly used field equipment and proper methods of collecting data and specimens. The data will be collected in the field, analyzed and presented in a report.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. Develop a hypothesis and devise an experimental procedure with steps intended to be used to test the validity of the hypothesis.	X	X	X	X	X	X	X	X	X
2. Conduct field research and collect qualitative and quantitative data.	X		X	X	X	X	X	X	X
3. Gather, summarize and analyze data and present in a report using the steps of scientific methods.	X		X	X	X	X	X	X	X

SC 275 - Internship

This course provides the student with practical training in scientific methods, technical laboratory skills, and field studies. With the assistance of an instructor-coordinator, the student is assigned to work under a supervisor in a governmental department or a private business in order to learn through actual work experience.

CLO	PLO			ILO					
	PLO 1	PLO 2	PLO 3	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:									
1. Demonstrate proper employee behaviors and work habits.	X	X	X	X	X	X	X	X	X
2. Perform environmental science tasks as assigned by a site supervisor.	X	X	X	X	X	X	X	X	X