Skills Certificate in Environmental Sciences

College Learning Outcomes Matrix: Rate each course from 1 to 5 with 5 being the most important

SKILLS CERTIFICATE IN ENVIRONMENTAL SCIENCE	Year of SLO Review	1. Written, Oral and Visual Communication:	2. Scientific and Quantitative Reasoning:	3. Critical Thinking/ Problem Solving:	4. Information Literacy:	GE	Certificate
BIOL/ENVS 138 Introduction to Environmental Science	13/14	2	4	5	3	X	X
BIOL 110 Introduction to Biology	11/12	3	4	5	2	X	X
CHEM 105 Chemistry in the Human Environment	11/12	3	4	4	3	X	E-1
GEOL 120 Physical Geology	12/13	5	3	3	2	X	E-1
GEOG 101 The Physical Environment	12/13	5	3	4	2	X	E-1
BIOL/ENVS 142 Environmental Policy and Decision-Making	13/14						E-2
BIOL/GEOL 145 Ethics in Science	13/14	4	4	4	4		E-2
GEOG 102 The Human Environment	13/14	5	3	4	2	X	E-2
BIOL 104 Ecology of Infectious Diseases		5	5	5	5		E-3
BIOL/ENVS 143 Marin Parks and Open Space		3	4	5	5		E-3
BIOL/ENVS 147 Food, People, Health, and the Environment	12/13	3	4	5	5		E-3
BIOL/ENVS 148 Marin County Agriculture		3	4	5	5		E-3

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GENERAL EDUCATION SLOS
WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING GE SLOS What assessment tools do you use Assess only SLOs that you rated 4 or 5.

SKILLS CERTIFICATE IN ENVIRONMENTAL SCIENCE	1. Written, Oral and Visual Communication:	2. Scientific and Quantitative Reasoning:	3. Critical Thinking/ Problem Solving:	4. Information Literacy:
BIOL/ENVS 138 Introduction to Environmental Science	Oral written exams/research papers	Oral written exams/research papers	Research papers	
BIOL 110 Introduction to Biology		Research paper/exam, Essays, MC Test	Research papers, Essays, MC Test	
CHEM 105 Chemistry in the Human Environment	Research paper	Exam questions, concept survey	Exam questions, concept survey	Research paper
GEOL 120 Physical Geology	Exams			
GEOG 101 The Physical Environment	Essays on midterm, oral presentations		Essays	
BIOL/ENVS 142 Environmental Policy and Decision-Making				
BIOL/GEOL 145 Ethics in Science				
GEOG 102 The Human Environment	Essays on midterm, oral presentations		Essays	
BIOL 104 Ecology of Infectious Diseases	Case study problem, Essay			
BIOL/ENVS 143 Marin Parks and Open Space				
BIOL/ENVS 147 Food, People, Health, and the Environment				
BIOL/ENVS 148 Marin County Agriculture				

Skills Certificate in Environmental Sciences

Environmental Science Skills Certificate
TOTAL UNITS 16-17

Requirements
BIOL/ENVS 138 Introduction to Environmental Science
BIOL 110 Introduction to Biology
Choose 3 units from the following electives:
CHEM 105 Chemistry in the Human Environment
Or
GEOL 120 Physical Geology
Or
GEOG 101 The Physical Environment

Choose 3 units from the following electives:
BIOL/ENVS 142 Environmental Policy and Decision-Making
Or
BIOL/GEOL 145 Ethics in Science
Or
GEOG 102 The Human Environment
Choose 3 or 4 units from the following electives:
BIOL 104 Ecology of Infectious Diseases
BIOL/ENVS 143 Marin Parks and Open Space
Or
BIOL/ENVS 147 Food, People, Health, and the Environment
Or
BIOL/ENVS 148 Marin County Agriculture

Student Learning Outcomes

Upon completion of this certificate, students will be able to:

1. Describe the major components and processes of ecosystems and their interrelationships.

2. Describe the major impacts of humans on Earth's ecosystems.

3. Outline local and global alternatives that could improve ecosystem health.

4. Apply existing knowledge to solve environmental problems.

Skills Certificate in Environmental Sciences

THESE CERTIFICATE OUTCOMES EQUAL WHICH COURSE OUTCOMES FOR THESE COURSES

SKILLS CERTIFICATE IN ENVIRONMENTAL SCIENCE	Describe the major components and processes of ecosystems and their interrelationships.	Describe the major impacts of humans on Earth's ecosystems.	Outline local and global alternatives that could improve ecosystem health.	Apply existing knowledge to solve environmental problems.
BIOL/ENVS 138 Introduction to Environmental Science	A	B,C,F,G	B,C,D,E,F,G	B,C,D,E,F,G
BIOL 110 Introduction to Biology	B5	C1, C2	C1	C1, C2
CHEM 105 Chemistry in the Human Environment	1	1		1
GEOL 120 Physical Geology		3	3	3
GEOG 101 The Physical Environment	1,2			
BIOL/ENVS 142 Environmental Policy and Decision-Making		1	2, 3, 4	1, 2, 4
BIOL/GEOL 145 Ethics in Science		1, 3, 4,	4, 5	2, 5, 6
GEOG 102 The Human Environment	1	1, 2	2	1, 2
BIOL 104 Ecology of Infectious Diseases	1, 2	1, 5	1, 4, 5	4, 5
BIOL/ENVS 143 Marin Parks and Open Space	3	1, 2, 3,4, 7	2, 3,5, 6	3, 4, 5, 6, 7, 9
BIOL/ENVS 147 Food, People, Health, and the Environment	1	1, 2, 3, 4, 5, 6, 7	7,9	10
BIOL/ENVS 148 Marin County Agriculture	1	1,2	1,5	1,3,4,5

Skills Certificate in Environmental Sciences

IN WHICH COURSES ARE THESE DEGREE SLOS ASSESSED Use "I" for Intro, "P" for Practice and "M" for Mastery.

SKILLS CERTIFICATE IN ENVIRONMENTAL SCIENCE	Describe the major components and processes of ecosystems and their interrelationships.	Describe the major impacts of humans on Earth's ecosystems.	Outline local and global alternatives that could improve ecosystem health.	Apply existing knowledge to solve environmental problems.
BIOL/ENVS 138 Introduction to Environmental Science	M	M	M	M
BIOL 110 Introduction to Biology	I	I	I	I
CHEM 105 Chemistry in the Human Environment	I	I		I
GEOL 120 Physical Geology	I	I	I	I
GEOG 101 The Physical Environment	I	P	I	P
BIOL/ENVS 142 Environmental Policy and Decision-Making				
BIOL/GEOL 145 Ethics in Science				
GEOG 102 The Human Environment	I	P	I	P
BIOL 104 Ecology of Infectious Diseases				
BIOL/ENVS 143 Marin Parks and Open Space				
BIOL/ENVS 147 Food, People, Health, and the Environment				
BIOL/ENVS 148 Marin County Agriculture				

Skills Certificate in Environmental Sciences

DEGREE SLOS
WHAT ASSIGNMENTS DO YOU GIVE IN THESE CLASSES THAT ASSESS THE FOLLOWING DEGREE SLOS What assessment tools do you use Assess only SLOs that you rated 4 or 5.

SKILLS CERTIFICATE IN ENVIRONMENTAL SCIENCE	Describe the major components and processes of ecosystems and their interrelationships.	Describe the major impacts of humans on Earth's ecosystems.	Outline local and global alternatives that could improve ecosystem health.	Apply existing knowledge to solve environmental problems.
BIOL/ENVS 138 Intro to Environmental Science	Nutrient cycles	Food production / deforestation	Propose sustainable food production systems	Propose plan to repair stream bank
BIOL 110 Introduction to Biology	Food web analysis	Food web analysis	Food web analysis	Food web analysis
CHEM 105 Chemistry in the Human Environment	Exam Questions	Exam Questions		Exam Questions
GEOL 120 Physical Geology	Exams; Biome and Precipitation project	Exams; Changing water needs	Exams; Changing water needs	Exams; changing water needs
GEOG 101 The Physical Environment	Essay exam	Essay exam	Essay exam	Essay exam
BIOL/ENVS 142 Environmental Policy and Decision-Making				
BIOL/GEOL 145 Ethics in Science				
GEOG 102 The Human Environment	Essay exam	Essay exam	Essay exam	Essay exam
BIOL 104 Ecology of Infectious Diseases				
BIOL/ENVS 143 Marin Parks and Open Space				
BIOL/ENVS 147 Food, People, Health, and the Environment				
BIOL/ENVS 148 Marin County Agriculture				

ENVS_138	Introduction to Environmental Sciences	New Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. describe how ecosystems provide the necessary services for all life on earth. 2. Give alternative perspectives concerning various world views that can lead to valuing the earth system. 3. Explain how science will provide us with the foundations and processes needed to understand human systems and how our activities affect the planet. 4. Explain how an understanding of science will assist us in finding and implementing scientific, technological, economic, and political solutions to environmental problems. 5. Assess and apply environmental, ecology and sustainability principles to modern life and a technologically based society in a lab setting. 6. Assess the methodology utilized by environmental professionals to apply environmental indicators to assess current trends in our environment. 7. Examine the application of a systems approach to environmental and ecological principles used by government agencies, industry and other organizations to minimize environmental impact on natural resources.		

ENVS_142	Environmental Policy and Decision-Making	New Course
Expected Outcomes for Student:		
1. Describe main features of the most important pieces of federal, state, and local environmental legislation. 2. Examine critically an environmental issue of choice. 3. Identify and understand impacts of federal, state, or local policies or regulations that apply to the issue. 4. Specify the history, benefits, and/or drawbacks of our current environmental policies and planning processes.		

BIOL_110	Introduction to Biology	Revise Course

Expected Outcomes for Student:

Upon completion of this course, students will be able to:

A. demonstrate general understanding of biology as a science by:

1. comparing and contrasting the subject matter of biology and other natural sciences with respect to scale and other unique properties
2. describing the important areas of biology and organizing them by scale or other characteristics
3. comparing and contrasting scientific methods and non-scientific methods of explaining phenomena and producing information
4. distinguishing science from pseudoscience and primary scientific information from secondary scientific information

B. use major principles, generalizations or theories of biology and related sciences to explain specific phenomena, including,

1. use of plate tectonic theory to explain current positions and characteristics of continents and ocean basins.
2. use of atomic theory to explain properties of different atoms and molecules, (especially biological macromolecules) and changes in chemical reactions.
3. use of cell theory and genetic theory to explain the continuity and change in cells and multicellular organisms, including inheritance of observable traits and interactions between genes and their environment.
4. use of principles of homeostasis and positive and negative feedback to explain changes in physiological status of organisms, including health and disease.
5. use of ecological theory to explain structure of communities and ecosystems and movement of energy and nutrients within the biosphere.
6. use of evolutionary theory to explain the Earth's biological diversity.

C. apply understanding of biology to suggest solutions to major problems of current human society, including

1. threats to environmental health, including massive species extinctions, disruption of community relationships and altered ecosystem function.
2. threats to human health, including starvation, disease and lowered quality of life.

CHEM_105	Chemistry in the Human Environment	Revise Course

Expected Outcomes for Student:

1) Analyze everyday phenomena and current issues in modern society as they relate to the scientific method in general, and to chemical concepts in particular.
2) Provide a basic description of the organizational structure of matter from the subatomic to the macroscopic levels.
3) Demonstrate a basic understanding of how the properties of a material relate to its atomic-level structure, including concepts of energy, bonding, and chemical reactivity.
4) Recognize and apply several major classifications of chemical structure and patterns of reactivity.

GEOL_120	Physical Geology	Revise Course

Expected Outcomes for Student:

1. define endogenic and exogenic forces and processes that drive and resist the forces of change to the quasi equilibrium conditions of our Earth's lithospheric regime
2. recognize basic mineral and rock types, geologic structures. 3. recognize problematic concerns of our ever-shrinking natural resources
4. explain the significance of geologic time.

GEOG_101	The Physical Environment	Revise Course

Expected Outcomes for Student:

Students will be able to:
1. analyze the controls, distribution, and classification of world climates.
2. Describe seasonal Earth-Sun relations and explain resulting physical phenomena on Earth's surface.
3. Describe the Theory of Plate Tectonics, provide scientific evidence in its support, and explain its correlation to the creation of landforms.

ENVS_142	Environmental Policy and Decision-Making	New Course
Expected Outcomes for Student:		
1. Describe main features of the most important pieces of federal, state, and local environmental legislation. 2. Examine critically an environmental issue of choice. 3. Identify and understand impacts of federal, state, or local policies or regulations that apply to the issue. 4. Specify the history, benefits, and/or drawbacks of our current environmental policies and planning processes.		

BIOL_145 GEOL_145	Ethics in Science	Revise Course
Expected Outcomes for Student:		
1. Identify basic concepts that underlie ordinary morality and how they apply scientific practice. 2. Identify key ethical theories as a framework for analyzing bioethical and other scientific-related ethical problems 3. Describe what leads to ethical problems including causes inherent in the social context of the practice of science. 4. Identify and describe significant contemporary problems in bioethics and identify the moral questions that medical practice and the health issues raise. 5. Critically analyze ethical problems related to the development of technology and medicine and apply ethical theories these problems. 6. Apply moral reasoning to specific situations and defend the conclusions of that reasoning.		

GEOG_102	The Human Environment	Revise Course
Expected Outcomes for Student:		
Upon completion of this course, students will be able to: 1. Analyze the dynamics of population distribution and growth and the resultant environmental implications; 2. Examine the spatial distribution of human phenomena such as language, religion, ethnicity, urban settlements, nation states, industries, etc.; 3. Explore the ways in which human communities influence -- and are influenced by -- the natural environment with references to culture, technology, and resource utilization.		

BIOL_104	THE ECOLOGY OF INFECTIOUS DISEASE	Revise Course
Expected Outcomes for Student:		
1. Describe the natural history of infectious disease and its significance. 2. Explain the biology of disease producing microorganisms and how it affects the location, spread, and control of particular infectious diseases. 3. Compare the relationship between microorganisms, vectors and hosts. 4. Define the basic tenets of geographic medicine including climactic, biological and sociological factors. 5. Explain the role that human activity has played and continues to play in the occurrence of epidemics.		

ENVS_143	Stewardship of Marin Parks and Open Space	New Course
Expected Outcomes for Student:		
1. Describe major concepts and beliefs underlying the designation of parklands as different from other lands used by our modern civilization. 2. Outline the major events that led to our parklands being set aside for the special uses they serve today. 3. Describe the major processes of natural change that influence any piece of parkland and require attention from park visitors and park managers. 4. Describe the human activities that take place on parklands and how they relate to the modern concept of stewardship. 5. Name and describe both sides of some of the principal conflicts over approaches to managing parklands that have made headlines in Marin and around the world. 6. Explain the principal challenges and methods of management on the ground, as seen in the plans and activities articulated by the major agencies and individuals managing parkland in Marin. 7. Offer some suggestions of what should be done in a specific parkland and make a few predictions of what will likely happen to it in the future if these suggestions are followed and/or not followed. 8. Describe the general nature of park and open space management jobs and decide whether they represent a possible career option. 9. Use insights and experience gained from studying the process of solving local environmental problems in meeting environmental challenges of the future.		

ENVS_147	Food, People, Health and the Environment	New Course

Expected Outcomes for Student:

1. Describe the major components of the global food system: production, distribution and consumption.
2. Give a brief outline of the history of food procurement by humans
3. Describe the contributions of remaining hunting, gathering and fishing systems in the modern world.
4. Describe the major types of modern agricultural production: pastoral, un-irrigated agriculture and irrigated agriculture
5. Describe the major modern agricultural production systems and give the major inputs, outputs and environmental impacts involved in each.
6. Describe the modern food distribution system and its recent changes.
7. Describe the history of human population growth, including significant points of change.
8. Describe the history of eating patterns in different populations, noting common parallels
9. Explain significant human health conditions affected by eating patterns and nutrition.
10. Describe divergent views on the future of the food system, including those of the cornucopians, and the catastrophists, the conventional, organic and sustainable farmers, the concentrated and the dispersed distribution systems and the vegetarian, carnivore, omnivore and locavore consumers.

ENVS_148	Marin County Agriculture	New Course

Expected Outcomes for Student:

Describe the physical, biological and cultural environment of Marin and its suitability for agricultural production.
Outline the agricultural history of Marin.
Describe important past crises for Marin agric. and how they were resolved.
List the principle current agric. products and production systems of Marin and some challenges and innovations associated with each.
Use personal experience with specific people and places involved in local agricultural production in discussions of issues affecting local agriculture.