

## **Summit to Sea Environmental Science**



### **Course Syllabus**

### **Overall Course Description**

This course is designed around key concepts of A.P. Environmental Science; including Physical and Cultural Geography, Environmental Geology, Earth Science, Natural History and Resource Management. Students will learn concepts, principles and practices in a real world immersion construct; through field work and project-based learning.

True to experiential, place-based instruction, the themes are woven throughout the educational process. Using the ancient Hawaiian concept of “ahupua‘a,” or watershed, students explore the various climate zones of the island of Hawai‘i and study the environmental issues that impact each ecosystem. A majority of instruction takes place in the field. Each site visit is designed to focus the lesson and provide an opportunity to experience the reality of the location, issues, or activity.

### **Instructors**

The development of this course was overseen by Dr. Leon Watson of Hawai‘i Pacific University. The main instructor is Dr. David Cole, Professor of Botany at Hawaii Community College. Additional field scientists will contribute in their areas of expertise. Two field instructors (male and female) will live with the students to supervise during non-instructional time, meals, and outdoor activities.

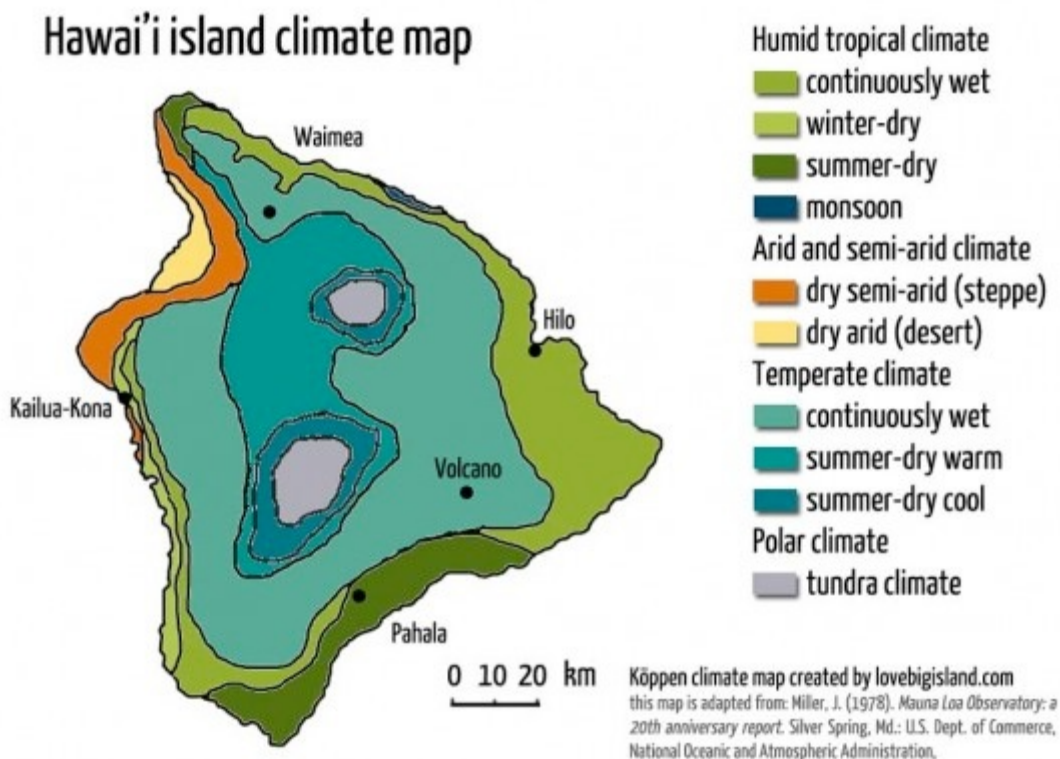
### **Instructional Methods**

Key questions, group discussion, preparatory lectures, and readings will prepare students for their field experiences. On-site observations, active engagement, and interpretation of the systems and issues firmly present will allow students to explain and apply the concepts. Students are encouraged to make observations, inquiries, and postulations in a constantly challenging and changing set of discoveries. They will learn how to observe natural phenomenon, how to think spatially, holistically, and in systems. They will learn how to see relationships, how to make and use maps and graphics, and how to measure and evaluate the quality of relevant data and information sources, and understand the sources and limitations of current knowledge.

Throughout this course, students will:

- Develop a deeper understanding of major global systems such as Earth, Sun relationships, energy and water, atmospheric relationships, weather and climate, biogeography, geomorphology, and landforms.
- Achieve a wider perspective of the real world, Hawai‘i, and some of the major physical features, environmental issues, and sustainable development prospects.
- Explore human and land relationships including resource use management, economic realities of production, and best management prospects for resource use and conservation.

The following is an annotated map of Hawai‘i island with the various climate zones; indicating the variety of ecosystems the students will explore during their field work experiences.



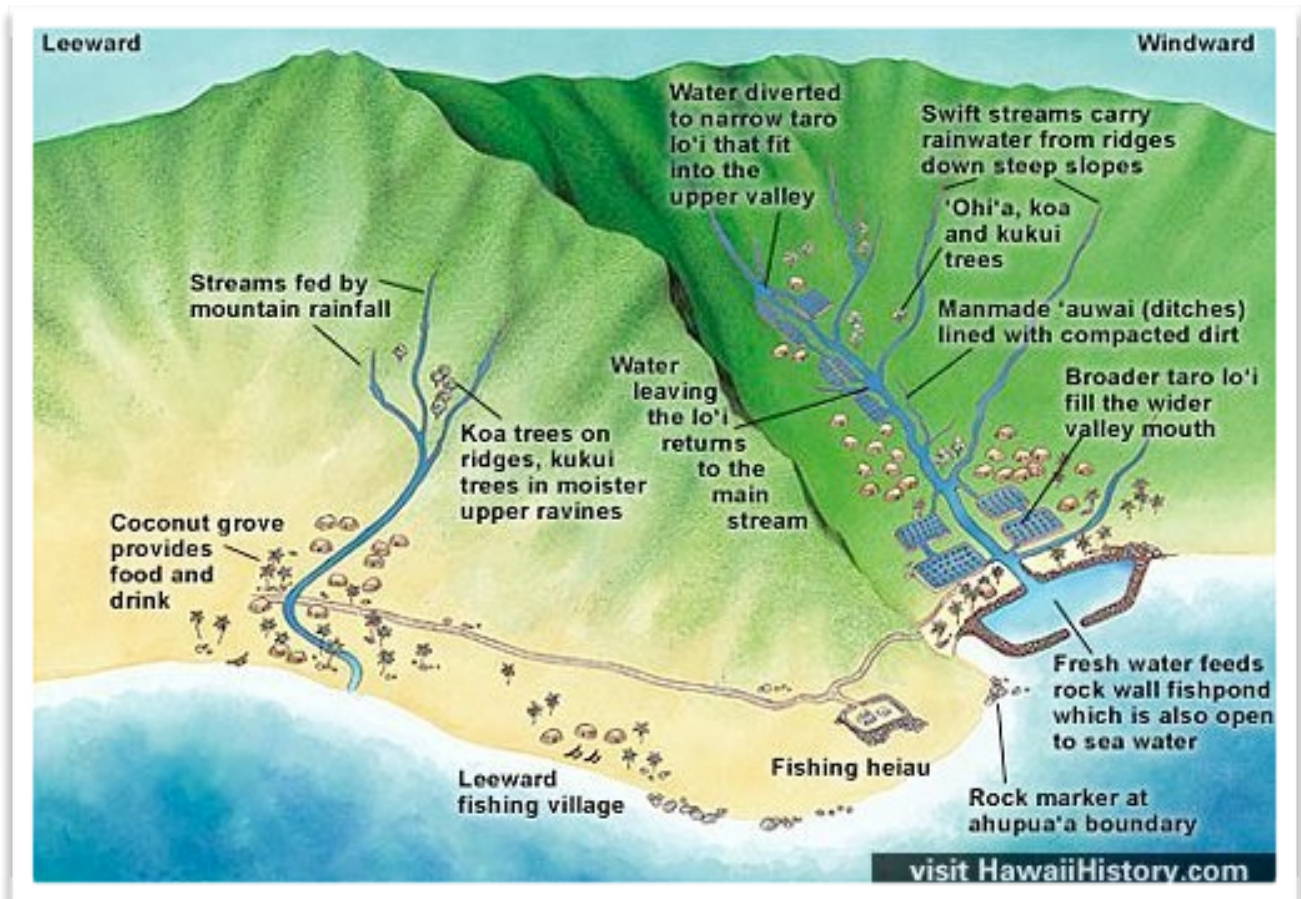
### Overall Themes

1. Geographical and geological understanding of natural forces and processes
2. Ecological and environmental systems, climate and biogeography studies
3. Natural and cultural resources
4. Resource use and abuse, best management practices: energy, land, water, biological
5. Human survival and prosperity, man-made interventions and economic enterprises

6. Sustainable development (reflecting on ancient practices to make modern applications)

### Cultural Connections

Sustainable living—from the mountains to the sea—was deeply ingrained in ancient Hawaiian culture. The following visual shows how the pie-shaped piece of land or “ahupua‘a” was organized according to the resources that were available at each elevation. The “kapu” system, their strict system of laws, included rules about fishing and food-gathering practices to ensure that precious resources were not depleted. This model is referred to throughout the course.



### Scientific Skills and Technology

In order to gain practical experience in the field of conservation research, several of the following skills will be taught and applied:

- Radio-telemetry and GPS mapping
- Water quality testing using a LabQuest 2
- Native and invasive species identification
- Plot-sampling

## **Community Leadership Skills**

The experience of living within a close community prepares high school students for university and professional life. Because the course is built within an experiential study abroad program, students not only study together but cook, eat, work, and share sleeping quarters with their peers. Living quarters are divided by gender and supervised by same-gender instructors. The students rotate responsibilities which benefit the community and teach practical life skills. They will each have the chance to lead the group on excursions and in group discussions. All students, including those who live on Hawai'i island, are required to live with their peers during the course. This aspect of the program is essential for the overall development of the student.

## **Grading Procedures**

Because of the field-based nature of this course, formative assessment will take place throughout the process as students learn to use and interpret scientific equipment and demonstrate their understanding through discussions and problem-solving with peers. Summative assessment will take place as students present their findings at the end of a field study, or through written analysis and reflection. Final grades will be weighted as follows:

Reasoning and Analysis= 40%

Oral Communication=30%

Written Communication=30%

Evidence of student learning will be available to the sending school in the form of a field notebook with notes and illustrations, in addition to presentation rubrics and written evaluations. A description of the scientific skills mastered and leadership qualities demonstrated will be included in the course transcript along with the letter grade for the course. Each student will participate in at least 15 hours of community service in collaboration with agencies such as The Volcano Ni'aulani Rainforest, The Mauna Kea Forest Restoration Project, Hawai'i Wildlife Fund, and local farmers. These service hours will also be documented on the transcript.

## **Course Credit**

The Hawai'i DOE equivalent of this course is Environmental Science ACCN #SIH3603. The instructional portion the 120 Carnegie hours necessary to earn 1.0 credit from a public high school. Each sending school may determine the credits they will allow based on individual school policies. Prospective students are encouraged to discuss the course with their school registrar in advance to determine what credits will be counted.

Registrars and counselors, please contact us with any questions about awarding course credit to your students. We look forward to working with you!