



## **CENTER FOR INTERNATIONAL PROGRAMS**

**Course name: Conservation Marine Biology.**

**Course code : ENV\_3160J & ENV-3160S**

**Total Contact Hours: 10 online course hours, 30 laboratory work hours, 50 field and class lecture hours.**

**Prerequisite: General Biology, be able to swim and snorkeling experience.**

## **COURSE DESCRIPTION**

This course aims to address the rapidly declining state of marine biodiversity by applying science to conservation. Marine Conservation Biology is a field in science that integrates several disciplines, including geology, oceanography, marine biology, ecology, ichthyology, and other. Scientific is incorporated to propose sustainable management strategies based on science. Marine ecosystems of the eastern tropical Pacific provide a baseline source for species of high commercial interest to satisfy humans' demand for food worldwide. However, numerous marine species are threatened by unsustainable activities, such as overfishing and habitat destruction. We will develop a critical understanding of Marine Conservation Biology, addressing biological and ecological questions such as what is tropical marine biodiversity; What do we need to do to conserve marine biodiversity?; What are the causes that threaten marine biodiversity?; What are the solutions for observed conflicts? The students will be exposed to several case studies, lectures, and practical activities by visiting field stations and natural laboratories along the Pacific coast of Costa Rica.

## **GENERAL OBJECTIVE**

Understand the need for integrative research and management methods to conserve tropical ecosystems and species by gaining hands-on experiences in ongoing monitoring projects of species and habitats.

## **SPECIFIC OBJECTIVES**

- I. Understand the general concept of Marine Conservation Biology.
- II. Learn about Costa Rican marine ecosystems, biodiversity and environmental issues through strong hands-on field trips and fieldwork in coral reefs, sandy and muddy beaches, mangroves and estuaries.

- III. Learn about the biology and ecology of species of economic and ecological importance and their ecosystems. Learn about current technologies used to convert knowledge on the biology, ecology and ongoing threats of endangered species, such as shark, ray and sea turtle species into critical information for conservation management.
- IV. Develop a scientific interest to answer aspects on the natural history of marine species and of conservation biology as a science.
- V. Promote teamwork in practical activities carried out in field laboratories, such as observation of fisheries discharge, dissection of specimens and snorkeling activities in Costa Rica's marine environments.
- VI. Encourage the student to develop a critical thinking in designing research studies and to propose alternatives to unsustainable practices that impact endangered marine species.

## **COURSE CONTENTS**

The course addresses the following topics into detail:

### **1. Marine Conservation Biology**

- a) Basic concepts about marine conservation
- b) The new science of Marine Conservation Biology
- c) What is tropical marine biodiversity?
- d) Where is the world's biodiversity found?

### **2. Threats to Tropical Marine Biodiversity**

- a) Fisheries
- b) Coastal development
- c) Habitat destruction

### **3. Critical marine ecosystems**

- a) Beaches
- b) Estuaries and mangroves
- c) Coral reefs and rocky areas

### **4. Endangered marine species**

- a) Sharks
- b) Rays
- c) Sea Turtles
- d) Fish

### **5. Conservation strategies**

- a) Wildlife monitoring
- b) Conservation Genetics (Molecular Biology lab included)
- c) Integrative coastal-marine management with focus on fishing communities
- d) Environmental education

## METHODOLOGY

### Attendance

Student's attendance is mandatory to every class and field activity. Students are only allowed one excused absence to any of the activities when proved through medical certification. Early departure from the field course is not allowed. The student will fail the course if he/she has more than one absence. **The approval of the course will be established after the 10-day online part.**

Professors have the right to expel a student from the classroom should he/she:

- 1) be improperly dressed.
- 2) be under the influence of alcohol/drugs.
- 3) behave in a disrespectful way.

If you tend to be late for class, you will lose 25% of your total grade.

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. **Please turn all devices OFF and put them away when class begins.** Devices may be used ONLY when the professor assigns a specific activity and allows the use of devices for internet search or recording. Those who fail to comply with the rule must leave the classroom for the remainder of the class.

This course will be composed of theoretical lectures and practical activities (oral presentation and field trip and laboratory activities). Some of the classes will be composed by short presentations prepared by the student, as indicated by the professor previously. Lectures will be carried out using the most variable multimedia available, such as power point presentations and videos and hand-on activities in the field and laboratory.

### Field trips

The entire field trip is mandatory. Lodging and meals are covered by the Program Fees. Students should be at VERITAS front door **on time** for the field trip departures. **We are not waiting for anyone. Students who miss the bus will have to get to the field trip location by themselves or FAIL the course.**

#### Important:

- Field trips **are not** excursions.
- Participants must be fully enrolled in this course and no guests are allowed.
- Students must be on time for all fieldtrip activities including departure from places and pre-schedule mealtimes.

- Although many places of the country have allowed us to find suitable accommodations, many of the volunteer, workstations or research areas require **rustic** accommodations.
- This is an environmental science course. Fieldwork may include long walks, boat rides and snorkeling activities which require good health condition.
- Things to bring (mandatory and to be bought before arriving to Costa Rica):
  - Water shoes, Velcro sandals or tennis shoes that can get wet, sandals.
  - Sunglasses, sun hats, breathable **long-sleeves and pants or leggings** for on-water activities, sun blocker.
  - Comfortable clothes for Croc and Snake monitoring at night.
  - Raincoat.
  - Flashlight, mosquito repellent, personal first-aid kit (your personal medicine, pharmacies are often far away from field stations).
  - Overall comfortable, sporty clothes that are easy to wash and dry.

### **Final Research Project**

Students will develop a Research Project, which consist of an oral presentation (minimum 15 minutes) supported by scientific information and a scientific essay. The topic will be any innovative and interesting proposal in terms of Marine Conservation Biology and will be guided by the professor in order to collect data through the field trip.

It is encouraged that students research on Costa Rica's marine biodiversity beforehand to establish personal interests and research abilities more rapidly.

Oral presentations will be performed before the student's departure from Costa Rica to Australia. The final submission of the scientific essay (between 8 to 10 pages) should reflect acquired knowledge and new reviewed literature of a selected topic and the research developed by the students. This article needs to be submitted from Australia one week after the arrival. The professor will provide additional materials and contacts of experts on request. All the documentation and articles related to the research will be uploaded in the Canvas portal and/or the Facebook webpage that will be created for this course.

The oral presentation & scientific article will be evaluated based on preparation (knowledge assimilation), presentation style (organization, smoothness, and clarity), slides (clarity, aesthetics), finishing on time, and correct answering of questions. Both the presentation and draft submission must be turned in on the assigned date, if not the grade will be 0 (unless the absence is justified).

### **On-line**

Students must research in depth a selected topic which they will present as an oral presentation before they depart from Costa Rica. They have to produce a scientific article based on the scientific information collected or found online as suggested by the professor. The articles and other resources will be uploaded in our "Canvas" platform.

## EVALUATION SYSTEM

<b>On-site Evaluation:</b>	
Field session participation (video field report)	10%
Laboratory participation (Fish ID & Forensic report)	25%
Oral presentation (research project)	30%
<b>On-line Evaluation:</b>	
Article discussion (readings and assignments)	10%
Submission of a scientific article	25%
<b>Final</b>	<b>100%</b>

Minimum final grade to pass the course is 75%

## EVALUATION SYSTEM DETAILS

### On-site evaluation:

#### **Field session participation 10%**

It will be evaluated in groups, according to the number of students, by means of a video report of field which must contain:

- The name of the students, the name of the course, as well as the logo of Veritas University and the logo of the University of origin each student.
- The content of the video will evaluate the registration of all the activities carried out in the field and in the laboratory in the video.
- The video can be narrated by the voice of the students or by means of key text that introduces each activity.
- The video must have a minimum duration of 3 minutes 30 seconds.

#### **Laboratory participation (report) 25%**

The reports of the students in the laboratory will be based according to the activities that are carried out, this implies work like: preparation of tissue, extraction of DNA, quantification of DNA, polymerase chain reaction (PCR), electrophoresis gel.

The student will receive a work guide in each laboratory which will have to complete step by step in each of the laboratory activities. Which you must then give to the professor for your review.

#### **Oral presentation 30%**

The oral presentation will be group, according to the number of students, will be exposed to the rest of the class and must contain the following aspects:

- Cover with the title of the research, name of the students, name of Veritas University, the University of origin of the students.
- Research objectives.
- Questions to develop in the exhibition.
- Introduction to the topic.

- Methods and materials used to collect information in these should appear: expert interviews, interviews with local people, interviews with tourists, taking audiovisual material (photos, videos, and surveys) to support the information collected.
- Important results, discussion and possible solutions to the problem posed.
- The bibliography must present a minimum of 10 references, these must be published scientific articles.
- Each group of students will have 20 minutes to expose their topic.

### **On-line evaluation:**

#### **Article discussion (readings and assignments) 10%**

Each student on each day of the online course will receive a scientific article or a technical document. The student will do their reading and as directed by the teacher, the student will have to solve a questionnaire, make a summary, essay or diagram related to the assigned reading. Each assignment must be sent on *Canvas* platform according to the date determined by the professor.

#### **Submission of a scientific article 25%**

It will be assessed according to the working groups formed in Costa Rica. The activity consists of collecting all the information collected and exhibited in the oral presentation. Subsequently, all these data will be captured in a document formatted as a scientific article with the following specifications:

- Title of the research, student's name and academic affiliation.
- Summary (abstract).
- Introduction.
- Methods and materials.
- Important results.
- Include figures or pictures.
- Discussion.
- Conclusion.
- All sections must carry bibliographic citations.
- Bibliographical references (minimum 15 references). **In APA version 6th edition.**
- Letter Times New Roman, source 12 to a space of 1.15.
- The work should have a minimum extension of 8 (eight) pages without counting the bibliography of the work.

## BIBLIOGRAPHY

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- Goreau, TF., NI Goreau. & TJ., Goreau. (1979). Corals and Coral Reefs. Scientific American. August, 1996: 124-136.
- Humann, P & N. Deloach. (2002). Reef fish Identification series. New World Publications. USA.
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- Reynolds III, JE. & SA Rommel. (1999). Biology of Marine Mammals. Smithsonian Institution Press. 578pp.
- Ruppert, E.E. & R.D. Barnes. (1996). Zoología de los Invertebrados. 6<sup>a</sup> Ed. Interamericana S.A. México. 1114pp.
- Rutzler, K. & IC Feller. (1996). Caribbean Mangrove Swamps. Scientific American. March 1996: 70-75.
- Wehrtmann, IS, & J Cortés. (2009). Marine Biodiversity of Costa Rica, Central America. MONOGRAPHIAE BIOLOGICAE. Vol 86.

**\*\*\*Scientific papers will be assigned during the course.**