

# **.VĒRITAS**

S T U D Y A B R O A D

**Center for International Programs and Sustainability Studies**

**Course name: Conservation Biology and Endangered Marine Species**

**Course code: ENV 3160**

**Total contact hours: 60**

**Pre-requisites: None**

## **COURSE DESCRIPTION**

This course is aimed to highlight the importance of conservation biology in managing endangered marine species by emphasizing in recent conservation efforts of umbrella species such as sea turtles and sharks in the Pacific of Costa Rica. Marine ecosystems of the eastern tropical Pacific provide a baseline source for species of high commercial interest in satisfying humans demand for food worldwide. However, numerous marine species are threatened by unsustainable human activities, such as overfishing and habitat destruction. We will develop a critical understanding of conservation biology, deepening in the general concept of biodiversity in species and ecosystems. We will analyze current case studies that focus on scientific investigations to answer critical life history aspects, recovery programs, species management, community conservation actions, and Marine Protected Areas (MPAs). The students will also be introduced to a wide range of practical activities by visiting field stations and natural laboratories in Costa Rica.

## **CLOTHING AND FOOTWEAR REQUIREMENTS**

It is necessary for foreign students to have clothes both for warm climate and for cold (not extreme), as well as closed shoes (hiking shoes and rubber boots if possible) since many

field trips are made to highlands, rainy zones, and sometimes to areas with the possible presence of snakes, insects, and other animals. We've never had an accident under those circumstances, but we want our students to be as comfortable and safe as possible. The appropriate clothing and footwear also facilitate the field work of this course.

## **AUDIENCE**

This course is structured for International Students attending the Study Abroad program at Universidad Veritas. However, courses are not exclusive to foreigners so a few native students could enroll in this course. Any person interested in marine biology, endangered species and conservation is welcome to take this course.

This is a theoretical-practical course and responds according to the professional profile to the following question:

**How has Conservation Biology been applied to document marine biodiversity, investigate human impact, and develop practical approaches to prevent the extinction of species?**

In order to respond this question, we will study the following **generative topics**:

- Fundamental concepts of Conservation Biology.
- Biodiversity in the present and past.
- Concept of species and evolution.
- International organizations for the conservation of species.
- Endangered marine species (EMS).
- Migration patterns and life cycles of EMS.
- Anthropogenic impact in marine ecosystems.

Along the course, the following **skills** will be fostered:

- Ability to understand the fundamentals of conservation biology as a science.

- Ability to debate about the significance of the biodiversity in past and presents.  
Ability to understand the fundamentals of conservation biology as a science.
- Ability to identify the international organizations for conservation and their interactions with society.
- Ability to discuss about the endangered marine species, their biology, and what makes them vulnerable.
- Ability to identify human impacts that threaten marine biodiversity.

Among the **values** and **attitudes** that will be promoted among the students are the following:

- Excellence in performance evidence.
- Responsibility to achieve goals.
- Tolerance to work in group.
- Respect to nature and their ecosystem (organism, stakeholder, and local community).
- Negotiating and knowing how to inspire trust and empathy.

### **COMPETENCIES, CRITERIA AND EVIDENCE**

The competencies for the Veritas University are reflexive and integral actions that respond to the professional profile and to the problems of the context, with suitability and ethical commitment, integrating the know-how and the of being, know-how and knowledge to grow in a perspective of improvement.

Below are both the disciplinary and general competencies, linked to their criteria and evidence of performance for this course.

Competencies	Key competencies	Evidence of learning
<p><b>Disciplinary</b></p> <p>Analyzes the applications of conservation biology and its approach to documenting biodiversity, human impact, and develop practical methods to avoid the extinction of endangered marine species.</p>	<p>Discuss the concept of conservation biology considering its history and definitions.</p>	<ul style="list-style-type: none"> <li>○ Oral presentations.</li> <li>○ Essay.</li> <li>○ Mind Maps.</li> </ul>
	<p>Distinguish different ways that scientists manage and document biodiversity at national and international levels.</p>	<ul style="list-style-type: none"> <li>○ Oral presentations.</li> <li>○ Essay.</li> </ul>
	<p>Analyze human impact on marine ecosystems considering the different stakeholders, their environmental conflict, and conservation actions.</p>	<ul style="list-style-type: none"> <li>○ Thematic discussions.</li> <li>○ Roundtable.</li> <li>○ Video field trip report.</li> </ul>
	<p>Applies genetic tools to support the identification of illegally traded species, according to the national and international conservation strategies.</p>	<ul style="list-style-type: none"> <li>○ Laboratory practices.</li> <li>○ Essay.</li> </ul>

Core/Generic		
Integrates concepts, nomenclature and key elements from the course to be used in upcoming professional life.	Learning to learn.	<ul style="list-style-type: none"> <li>○ Laboratory Practice Reports.</li> <li>○ Project presentation.</li> <li>○ Scientific article analysis.</li> <li>○ Field trip report.</li> <li>○ Group and individual presentations.</li> </ul>
Develops the knowledge, skills and attitudes necessary to learn how to communicate orally and in writing in the different areas.	Communicate thoughts of the discipline orally, graphically, and in written form.	<ul style="list-style-type: none"> <li>○ Laboratory Practice Reports.</li> <li>○ Project presentation.</li> <li>○ Scientific article analysis .</li> <li>○ Field trip report.</li> <li>○ Group and individual presentations.</li> <li>○ Roundtable.</li> </ul>
Integrates the knowledge, skills and attitudes necessary to learn the techniques of teamwork and leadership.	Execute teamwork and leadership.	<ul style="list-style-type: none"> <li>○ Laboratory Practice Reports.</li> <li>○ Project presentation.</li> <li>○ Scientific article analysis</li> <li>○ Field trip report.</li> <li>○ Group and individual presentations.</li> </ul>
Integrates the knowledge, skills and attitudes necessary to learn interpersonal	Respect towards others. Handles and resolves conflicts. Negotiates knowing how to inspire trust and empathy.	<ul style="list-style-type: none"> <li>○ Laboratory Practice Reports.</li> <li>○ Project presentation.</li> <li>○ Scientific article analysis.</li> <li>○ Field trip report.</li> </ul>

communication techniques.	Critical and logical thinking	<ul style="list-style-type: none"> <li>○ Group and individual presentations.</li> <li>○ Roundtable.</li> </ul>
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## **COURSE CONTENT**

### **Unit 1. What is Conservation Biology?**

- The new science of Conservation Biology.
- Conservation Biology in the Sea.
- Biodiversity in the past (extinction).
- Biodiversity (species diversity, genetic diversity and ecosystem diversity).

### **Unit 2. Endangered Marine Species and International Regulations**

- Current problems in Marine Conservation.
- International conventions for the conservation of species.
- Threats to Endangered Marine Species.

### **Unit 3. Concept of Species, Communities and Evolution**

- Concept of species.
- Evolutionary processes.
- Speciation and adaptation.

### **Unit 4. Conservation Genetics: Lets go to the lab!**

- Introduction to conservation genetics.
- Application of genetic tools in Conservation.
- Lets go to the lab, DNA extraction, PCR and electrophoresis.

### **Unit 5. Tropical Conservation in Marine Biology: case studies**

- Research and case studies on marine species from the Eastern Tropical Pacific.
- Marine Protected Areas in Costa Rica.

## **METHODOLOGY**

This course promotes the interaction between the students and the teacher, in order to develop an active feedback between the two parties. The course will be composed of participatory activities such as debates, roundtables, oral presentations and laboratory practices. Additionally, through current case studies students can propose solutions for the conservation of marine endangered species and discuss controversial topics regarding conservation biology in the tropics. This in turn will allow students to learn and critically analyze different real life situations in which they can apply the theory to propose new ideas and strategies for conservation.

The role of the professor is to mediate, facilitate and guide the teaching and learning process, allowing students to build and self-regulate learning, based on their previously collected information. The student is active, the teaching-learning process is collective and socialized. It also fosters social integration, the development of group work skills, community feeling and respect, without neglecting individualization.

## **EDUCATIONAL RESOURCES**

In order to guarantee a good development of the course, therefore, to guarantee learning, the following resources are available: an updated bibliographic database, multimedia equipment that students can use for their individual presentations, whiteboards and other school equipment for weekly sessions, and readings provided by the educator. All of these complement the suggested projects and provide the students with higher possibilities of knowledge ownership. Most of the lessons will take place in the classroom.

During independent work periods students will be able to attend the institution. A campus library, study rooms, and computer labs are available for the students' independent work time. Free Wi-Fi connection for students, educators, and staff is provided on campus, which gives students the possibility to work not only in the library or computer labs, but also around campus.

### **LEARNING EVALUATION**

In order to make the course or program better competencies-based evaluation compiles and evaluates evidence by taking into account feedback providing pre-established criteria. The course evaluation must be aligned with the competencies and the teaching methodology. There is a rubric for each evaluation resource and the details will be provided in **CANVAS LMS**. Even though the rubric grants a grade, it is also a quantitative and qualitative description of the students' performance. The rubrics include the core and discipline key competences.

<b>Rubrics</b>	<b>Weight</b>
Roundtable Debate: <ul style="list-style-type: none"> <li>○ One thematic discussion of a current issue in Conservation Biology.</li> </ul>	<b>10%</b>
"IUCN" Oral Presentation: <ul style="list-style-type: none"> <li>○ Group/individual</li> </ul>	<b>15%</b>
Marine Endangered Species Oral Presentation: <ul style="list-style-type: none"> <li>○ Group/individual oral presentations</li> </ul>	<b>15%</b>
Video field trip report: <ul style="list-style-type: none"> <li>○ One video field trip report</li> </ul>	<b>10%</b>
Lab Report	<b>25%</b>



<ul style="list-style-type: none"> <li>○ Laboratory practices (“CIS Forensic on illegal trade of shark fins”)</li> </ul>	
<p>Final presentation:</p> <ul style="list-style-type: none"> <li>○ Topic assigned at the beginning of the course (includes scientific article and oral presentation)</li> </ul>	<b>25%</b>
<b>TOTAL:</b>	<b>100%</b>

### **LEARNING STRATEGIES**

The following learning strategies will be carried out:

#### **1. Oral presentation:**

By means of digital presentations (power-point) each group of students will explain the content pertaining to a research topic assigned in advance by the teacher. The students must present at the end of this presentation the bibliographic sources in APA format, Sixth Edition, with a minimum of 5 references and their respective connection link. From digital presentations, from previously assigned topics, it is intended that students through teamwork or individually can be able to formulate critical and logical ideas that can then be transmitted orally and encourage the rest of the audience (classmates) to issue different points of view.

For the purposes of this course, two oral presentations with a value of **10%** each

- For the first oral presentation, the student will choose one technical report from the IUCN. They will research this report and complement it with other resources such as scientific journals, technical reports, etc. to perform a PowerPoint presentation.

- For the second oral presentation: the students will choose one marine endangered species and they will research about the conservation status (IUCN) according to their: Distribution, biology, ecology, population trends and threats related to the species investigated.

## **2. Laboratory practice:**

This fascinating experience will be implemented throughout the subject of the course “Conservation Genetics”. Four lab practices will focus on the activity “CIS Forensic on the illegal trade of shark fins”, where the student will learn how to extract DNA, PCR, and Electrophoresis techniques to identify shark species from fin samples. Laboratory session will be performed in the Molecular Biology laboratory (BIOMOL).

The laboratory session will be assessed with a value of **25%** based on the information acquired and evaluated on the understanding from application tools to prevent the illegal trade of endangered species, such as the genetic approaches demonstrated during the lab sessions.

For each laboratory session the students will prepare a small report in which they describe the reagents (general description and function) that are going to be used in that session. This will have a total value of **5%**, one for each laboratory session.

## **3. Debate:**

The students will organize in two groups to investigate all the information related to a current issue regarding Conservation Biology and individually, may issue their own opinion by formally interpreting and evaluating a specific topic. The objective is that the student correlates his research and his own knowledge and can clearly argue a possible application in real life. A group of students will dedicate to promote oral expression and investigation about several controversial topics in Conservation Biology, to produce ideas and points of

view that either agree or disagree in order to generate new learning and discussion in the audience. The members of the group must choose a moderator. The moderator begins the discussion, informs the class about the questions from the topic, introduces the members of the roundtable group to the class, indicates when each member of the will intervene; asks previously planned questions, and takes notes that might work as conclusions. The moderator must be emotionally strong, must be unbiased, and must keep the group united. The moderator usually sits in the middle of the group to keep members focused and monitor how people work towards their goals. The group will investigate the topic and will choose a moderator. The debate should last no longer than 20 to 30 minutes to discuss the topics and 5 minutes to draw conclusions.

#### **4. Video Field trip report:**

The field trip will be assessed by means of a video report where audiovisual material (photographs and/or video) will be included, where each of the activities performed in the field trip. The idea, in this case, is that students have the opportunity to interact and observe some marine species, the medium in which these species are found. Therefore, all the information and experience acquired during the field trip will be translated into an audiovisual material (videos) where they will describe each of the activities performed, which they have learned, results, discussions, and their opinions.

#### **5. Final research presentation:**

At this point students will conduct a thorough investigation into the topic assigned at the beginning of the course. They will have to carry out the analysis of their own results, consult literature and if possible, consult experts on their research topic. At the end of the course students will present the information collected and analyzed in scientific article format to the professor.

This work aims to confront the student to a scientific investigation, which implies introducing and familiarizing each person with the different activities that are carried out in

an investigation in the real life or a compilation of research information with respect to a particular topic in Conservation Biology and Endangered Marine Species. The research will be carried out individually and will need to be contrasted with reported or published cases of studies and their subsequent interpretation of their results. All of these findings will be presented and explained to the rest of the class through an oral presentation. During the course, the student will be asked to present progress reports on their current research; the goal of this activity is for students to make small progress on their current research project (successes and misrepresentations) in front of the rest of the class and discuss possible suggestions for improving.

This final research presentation has a total value of **25%**, has three qualification rubrics which have a different evaluation percentage:

- 1)** the first rubric has a scale of 1 to 5 and has a percentage of 20% where the work will be assessed is the formal writing and progress (during the course)
- 2)** the second part, with a scale of 1 to 3 with a percentage of 5%, which include the performance of the student & the format of the oral presentation.

Along the sessions, several nonvaluated learning activities will be performed, such as group discussions, brainstorming, topic summaries, small in class research and result sharing, posters and summary cards creations, expert's on specific topics visits and lectures, and laboratory activities when possible. The students will take advantage of the development of mental maps (systems mapping) through which they will be able to investigate, extract, summarize and expose the most important information. A roundtable will also be conducted related to several questions about a controversial documentary to produce ideas and points of view in order to generate a rich discussion in the class.

## **ATTENDANCE**

### **Regarding classes:**

1. Students are only allowed a total of two (2) nonconsecutive (back-to-back) class absences. A student shall fail the course if more than two absences are registered.
2. Three late arrivals to class (within the first 15 minutes) are treated as one absence. Attending class 30 minutes late without an official justification will also count as an absence.
3. In the case of an absence from any assignment evaluated in class (presentations, evaluations, field trips, etc.) a student will be given a grade zero unless an official document is presented within one week of the absence.
4. If a student presents an official document to excuse the absence, the missed assignment is to be presented on that same day.

### **Regarding field trips:**

5. An unjustified absence on a field trip will immediately result in the loss of all points assigned to that specific trip. However, if an official document justifying the absence is presented, 50% of the assignment points may be obtained on presentation of a complementary research assignment, to be agreed upon with the professor, within one week of the field trip.
6. An absence on a field trip may be justified should two course field trips coincide. In such a case, and in order to avoid losing points, students shall be able to opt for carrying out a research assignment.

## **CODE OF CONDUCT**

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

1. Be disruptive in the classroom.
2. Behave in a disrespectful way.
3. Be under the influence of alcohol or even smells like alcohol.
4. Be under the influence of any illegal drug.
5. Shows hygiene problems that may disturb other students.

## **ELECTRONIC DEVICES**

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 period. If situation happens again, 10 points will be deducted from the final participation grade.

## **PROGRAM POLICIES**

The student must comply with the provisions of the CIPSS Program Policies available on the Canvas platform.

## **BIBLIOGRAPHY**

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## **CHRONOGRAM**

<b>Week</b>	<b>Contents</b>	<b>Learning strategies</b>
<b>1</b>	<b><u>Unit 1: What is Conservation Biology?</u></b> The new science of Conservation Biology Conservation Biology in the Sea	Thematic discussions, Mind maps
<b>2</b>	<b><u>Unit 1: What is Conservation Biology?</u></b> Biodiversity in the past (extinction) Biodiversity (species diversity, genetic diversity and ecosystem diversity)	Thematic discussions, Roundtable
<b>3</b>	<b><u>Unit 2: Endangered Marine Species and International Regulations</u></b> Current International and problems in Marine Conservation	Thematic discussions, Roundtable
<b>4</b>	<b><u>Unit 2. Endangered Marine Species and International Regulations</u></b> International conventions for the conservation of endangered species Endangered marine species current threats	Reports, Thematic discussions, Essay
<b>5</b>	<b><u>Unit 3. Concept of Species, Communities and Evolution</u></b> Concept of species Why protect a species?	Thematic discussions, Case studies, Oral presentations
<b>6</b>	<b><u>Unit 3. Concept of Species, Communities and Evolution</u></b> Evolution Speciation and Adaptation	Thematic discussions, Case studies

<b>7</b>	<b><u>Unit 4. Conservation Genetics: Let's go to the Lab!</u></b> Conservation Genetics for the protection of Endangered Marine Species	Thematic discussions, Mind maps, Oral presentations
<b>8</b>	<b><u>Unit 4. Conservation Genetics: Let's go to the Lab!</u></b> Lab: "CIS Forensic on illegal trade of shark fins"	Laboratory Practice, Presentation of results
<b>9</b>	<b><u>Unit 4. Conservation Genetics: Let's go to the Lab!</u></b> Lab: "CIS Forensic on illegal trade of shark fins"	Laboratory Practice, Presentation of results, Fieldtrip report
<b>10</b>	<b><u>Unit 5. Tropical Conservation in Marine Biology</u></b> Research and case studies on marine species from the Eastern Tropical Pacific	Thematic discussions, Research, Case Study, Essay
<b>11</b>	<b><u>Unit 5. Tropical Conservation in Marine Biology</u></b> Research and case studies on marine species from the Eastern Tropical Pacific	Reports and discussions, Research, Case Study
<b>12</b>	Final Research Presentation	Case study, Thematic discussions, Research, Presentation of results, Essay

*Please note that this chronogram is tentative and subject to change.*