



Center for International Programs and Sustainability Studies

Course name: Marine Mammals of Costa Rica: Biology for Conservation

Course Code: ENV 3200

Total contact hours: 60 hours

Pre-requisites: None

COURSE DESCRIPTION

This course is an introduction to the biology of marine mammals with emphasis of the species from Costa Rica, including whales, dolphins, manatees, fur seals and sea lions. Topics covered include the evolution, physiology, behavior, and ecology of marine mammals. Particular attention is paid to current topics in the management and conservation of cetaceans (whales and dolphins) in Costa Rica within marine protected areas or with local coastal communities and stranding phenomena. Fieldwork will focus on basic ecological monitoring techniques and primary care on marine mammals' stranding.

AUDIENCE

This course is structured for international students attending the Study Abroad Program at an LCI Education university campus. However, courses are not exclusive to foreigners so local degree-seeking students may enroll in this course. Some of the courses are also taught in Spanish as part of our Bachelor's in Sustainability Management or Business Administration programs.

This is a theoretical-practical course and explores/responds to the following inquiry according to the professional/disciplinary profile:

¿How to apply the elements of the biology and ecology of marine mammals for the valuation of their uses in different sectors and the promotion of their conservation?

To answer this question, the following **generative topics** will be studied:

- Diversity and morphology of marine mammals.
- Marine conservation and marine mammals.
- Adaptations of mammals to the aquatic environment.
- Marine Mammal Stranding's & Response.
- Benefits and threats of marine mammals.

Throughout the course, the following skills will be promoted:

- Ability to identify the main biological and ecological characteristics of marine mammals.
- Ability to compare species of marine mammals.
- Ability to determine the main challenges of marine conservation and sustainable tourism related to marine mammals.

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

- Teamwork and leadership.
- Systemic thinking.
- Logical and communicative intelligence.
- Problem-solving.
- Learning how to learn.
- Interest in marine conservation.
- Interest in tourism sustainable

COMPETENCES, CRITERIA AND EVIDENCE

The competencies for 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 knowledge to know 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 competences	Learning Assessments
Discipline Analyze the biological and ecological aspects of marine mammals that allow assessing the uses they receive and thus promote their conservation and responsible use.	1. Differentiates the basic biological and ecological characteristics of marine mammals according to a particular marine ecosystem.	○ Correct marine mammal's visual identification assessment.
	2. Deducts threats to cetaceans according to the uses they receive by different sectors of society.	○ Species fact sheet correctly developed.
	3. Evaluates the impact of the main uses to marine mammals, according to the particular characteristics of human activities, species and their ecosystems.	○ Review: Marine Mammal conservation topics correctly developed and presented.
Generic/Core		
Integrate the knowledge, skills and attitudes to learn continuously and through one's life pursuing and efficient development in the knowledge-bases society.	1. Learning to learn.	○ Review: Marine Mammal conservation topics correctly developed and presented.

<p>Integrates the necessary knowledge, skills and attitudes to learn interpersonal communication techniques.</p>	<p>2. Communicate thoughts of the discipline orally, iconically, and in written form.</p>	<ul style="list-style-type: none"> ○ Active role playing: cetacean stranding. ○ Species fact sheet correctly developed. ○ Review: Marine Mammal conservation topics correctly developed and presented.
<p>Builds the necessary knowledge, skills and attitudes to learn how to communicate orally and in written form in the different disciplines that make up the curriculum.</p> <p>Integrates the necessary knowledge, skills, and attitudes to learn teamwork and leadership techniques.</p>	<p>3. Execute teamwork and leadership</p>	
<p>Integrates the necessary knowledge, skills, and attitudes to learn interpersonal communication techniques.</p>	<p>4. Relate well to others. 5. Manage and solve conflicts. 6. Negotiate reliably and empathetically. 7. Speak responsibly 8. Listen attentively.</p>	<ul style="list-style-type: none"> ○ Active role playing: cetacean stranding. ○ Species fact sheet correctly developed. ○ Review: Marine Mammal conservation topics correctly developed and presented.

COURSE CONTENT

Unit 1. Marine conservation and marine mammals.

- Understanding ocean benefits.
- Threats to oceans and coasts.
- Ocean benefits from diversity of marine mammals.
- Effects of threats to diversity of marine mammals.

Unit 2. Diversity of Marine Mammals.

- Diversity and morphology.
- Evolution.
- Taxonomy of Marine Mammals: Odontocetes, Mysticetes, Pinnipeds, Sirenians.

Unit 3. Adaptations to the aquatic environment.

- Locomotion.
- Thermoregulation.
- Anatomical features.
- Diving.
- Physiology.

Unit 4. Cetaceans Societies.

- Social structure.
- Reproductive strategies.
- Cetacean communication.

Unit 5. Marine Mammal Strandings & Response.

- Immediate care & Moving.
- Reorientation & Release.

- Monitoring.
- Costa Rica and brucellosis as cause of stranding in the Eastern Tropical Pacific.

METHODOLOGY

This is an introductory course on the topic of marine mammals in Costa Rica. The objective of the course is that students can differentiate the biological and ecological characteristics of marine mammals from their threats and ecological impacts of their use. The activities are designed through lectures and independent research students can identify the main characteristics of marine mammals. Under the analysis of a single species present in the country, a fact sheet will be developed that will address the issues of threats and their uses. Finally a review will be developed in different conservation topics that currently are of importance in marine ecosystems and marine mammals as well as public health impact.

Classes are of an interactive nature, stimulating the collective construction of knowledge; so, the students can recognize, by their own means, the context in which they are and how they can use it to understand the topics of the course for use in their future careers. Along the course the expository method is used both by the professor and by students, individually and in groups, always promoting the participation of the students through their direct intervention in discussions, extension of concepts and analysis of the topics exposed. Since research is a pillar of the subject, the subjects to be discussed and exhibited in class and in the different assignments, are firstly investigated at a bibliographic level by the students, as a prerequisite to present group and individual work products. 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 previous and significant knowledge; 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 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. 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 ASSESSMENT

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.

ASSIGNMENTS	PERCENTAGE VALUE
Marine mammal’s visual identification assessment	20%
Species fact sheet	20%
Role playing	20%
Review and oral presentation (20% each)	40%
Total	100%

LEARNING STRATEGIES

The following learning strategies will be developed:

1. Rubric to evaluate the Marine mammal's visual identification assessment

The Marine mammal's visual identification assessment will be done weekly in four exercises and the student will recognize 20 animals. Each animal presented using power point slides will have a value of 0.25 points for a total of 5% per week. This exercise will be performed individually or in pairs (depending of the number of students) and discussed during the same class. The students can use books, apps and internet to approach the identification.

Indicator	Excellent 0.25%	Good 0.13 %	Insufficient 0%
Identify the Order or Parvorder and Family of the individual or group in the photography	Student identifies in a correct way the Order or Parvorder and Family of the marine mammals photo showed	Student identifies in a correct way only the Order or Parvorder, or Family of the marine mammals photo showed	Student cannot identify the Order or Parvorder and Family of the marine mammals photo showed
Total			

2. Species fact sheet:

This is a product that will be developed individually. It will allow the student to analyze and interpret the theoretical aspects relevant to each species and must synthesize the information received in the course and located in literature. This work will be developed weekly as part of the classes in the computer laboratories.

3. Role play

The simulation of a stranding event aims for students to apply their theoretical knowledge about the attention of stranded marine mammals in a practical and immediate way.

4. Review-final project:

The review will be done individually. Different conservational topics will be chosen by the student from an available list of a topic or from a particular topic of interest of the student that wants to develop during the review. The students will learn how to prepare a draft for a scientific paper making a review and an oral presentation for the group. This work will be developed weekly as part of the classes in the computer laboratories.

ATTENDANCE

Regarding classes:

1. Students are only allowed a two (2) **non-consecutive (back-to-back) class absences**. A student shall fail the course if more than two absences are registered by the professor. Administration does not control attendance.
2. Three **late arrivals** to class (arrival after 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 of 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 upon 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 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.
4. Be under the influence of any illegal drug.
5. Shows hygiene or odor problems that may disturb other students.

ELECTRONIC DEVICES

The use of cell phones, smartphones, 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. Using devices while the professor or other peers are lecturing, or presenting is perceived as a lack of interest and disrespectful.

STUDY ABROAD PROGRAM POLICIES

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

BIBLIOGRAPHY

1. Jefferson TA, Webber MA, Pitman RL, et al. Marine Mammals of the World: A Comprehensive Guide to Their Identification. 2nd ed. London, UK: Academic Press; 2015
2. Hernández-Mora, G., Palacios-Alfaro, J. D., & González-Barrientos, R. (2013). Wildlife reservoirs of brucellosis: Brucella in aquatic environments. *Revue scientifique et technique (International Office of Epizootics)*, 32(1), 89–103. <https://doi.org/10.20506/rst.32.1.2194>
3. Advances in Marine Vertebrate Research in Latin America (pp.293-319 Chapter: 12) Publisher: Springer Press Editors: Marco R Rossi-Santos, Charles W. Finkl. DOI:[10.1007/978-3-319-56985-7_12](https://doi.org/10.1007/978-3-319-56985-7_12)
4. Granados-Zapata A, Robles-Malagamba MJ, González-Barrientos R, Kot BC-W, Barquero-Calvo E, Cordero-Chavaría M, Suárez-Esquivel M, Guzmán-Verri C, Palacios-Alfaro JD, Tien-Sung C, Moreno E, Hernández-Mora G. Pathological Studies and Postmortem Computed Tomography of Dolphins with Meningoencephalomyelitis and Osteoarthritis Caused by *Brucella ceti*. *Oceans*. 2022; 3(2):189-203. <https://doi.org/10.3390/oceans302001>
5. APA 7th ed. <https://normas-apa.org/etiqueta/normas-apa-2021/>

CHRONOGRAM

Week	Contents	Learning strategies
1	Marine environment: threats and benefits from oceans	Topic discussion and independent research
1	Diversity and morphology of marine mammals of the world	Topic discussion and independent research

	Taxonomy: pinnipeds, sirenians, odontocetes, mysticetes	
2	Marine mammals in Costa Rica Fact sheet presentation (30 species)	Topic discussion and independent research
2	Cetaceans: taxonomy, identification, evolution, adaptations to the aquatic environment: (locomotion, thermoregulation, anatomical features, diving and physiology)	Topic discussion and independent research
3	Pinnipeds and sirenians; adaptations to the aquatic environment: locomotion and thermoregulation, anatomical features, diving and physiology	Topic discussion and independent research
3	Cetacean societies, Social structure Reproductive strategies	Topic discussion and independent research
4	Cetacean societies Cetacean communication	Topic discussion and independent research
4	Marine Mammal Stranding & Response: Immediate care, Reorientation & Release, causes of stranding in Costa Rica	Laboratory
5	Review presentations	Topic discussion and independent research
5	Critic knowledge of science Visual material of cetaceans to understand the gap of knowledge in cetaceans of the world	Topic on conservation of marine mammals and marine ecosystems

Please note that this chronogram is tentative and subject to changes