



Center for International Programs and Sustainability Studies

Course name: Climate change Impacts and Adaptations

Course code: ENV 3740

Contact hours: 60 hours

Prerequisites: None

COURSE DESCRIPTION

This course is an introduction to understanding climate change, its causes, consequences and effects it has on natural plant and animal populations in the whole planet, including humans.

The human race is facing several problems because of climate change, and these effects will probably increase in the near future. As temperatures continue to rise, producing large effects in all kinds of habitats, how will animals and plants be able to adapt to such fast changes? And, what are we humans, as the responsible party, doing to deal with global warming? Can we really answer these questions? Do we have the knowledge to reverse current conditions, and if so, what is being doing at the global level? And finally, how is the "political climate" being addressed in regards to climate change?

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 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 do plants and animals (including *Homo sapiens*) respond to climate change, and how can we use this information to prevent the affectation of species and their ecosystems?

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

- Causes of climate change
- Carbon cycle
- Climate models
- Impacts on ecosystems
- Adaptation and mitigation
- Global and national policies

Thought the course, the following skills will be promoted:

- Understand climate change, its causes, and consequences.

- Understand the effects of climate change on habitats around the world and the natural populations that inhabit them.
- Analyze and understand the evidence that supports climate change.

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

- Teamwork and leadership
- Systemic and innovative thinking
- Logical and communicative intelligence
- Interest in solving problems
- Interest in learning to learn
- How to negotiate 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, 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.

Competences	Key Competences	Learning Assessments
Disciplinary		
Analyze the scientific evidence for the study of local and global climate patterns considering the processes responsible for climate and its variations.	Research historical data and the use of climate models, considering aspects of climate prediction.	<ul style="list-style-type: none"> ○ Research Report ○ Discussion about the evidence
	Discuss the evidence that demonstrates the importance of the	<ul style="list-style-type: none"> ○ Rehearsals ○ Round table

	atropogenic effect, considering the prevailing climate change.	<ul style="list-style-type: none"> ○ Article Discussion
General (Skills)		
Integrates the knowledge, skills and attitudes needed to learn continuously throughout life considering effective development in the knowledge society.	Learning to Learn	<ul style="list-style-type: none"> ○ Written reports ○ Group discussions
Develops the knowledge, skills and attitudes needed to learn how to communicate orally and in writing in the native language in the different discipline areas that make up the curriculum.	Communicate disciplinary thoughts in oral, iconic and written form.	<ul style="list-style-type: none"> ○ Oral presentations ○ Reading reports
Integrates the knowledge, skills and attitudes needed to learn teamwork and leadership techniques considering mentoring and evaluation.	Teamwork and leadership	<ul style="list-style-type: none"> ○ Problem solving ○ Oral presentations
Integrates the knowledge, skills and attitudes needed to learn interpersonal	<p>Relating well with others</p> <p>Manage and solve conflicts</p> <p>How to negotiate knowing how to inspire trust and empathy</p>	<ul style="list-style-type: none"> ○ Research reports

communication techniques.	Speak with responsibility and property	
Develops the knowledge, skills and attitudes needed to learn how to communicate orally and in writing in the foreign language in the different discipline areas that make up the curriculum.	Communicate in oral and written form in the foreign language in everyday exchanges and simple texts.	○ Article Discussion
Integrates the knowledge, skills and attitudes needed to form and carry out life plans and business projects, setting goals and reaching them with motivation to achieve success.	Develop leadership for a personal project, committed to collaborative learning	○ Creativity workshop
	Design and offer solutions in dialog and collaboration, establishing and fulfilling commitments.	○ Creativity workshop

COURSE CONTENT

Topic 1: Climate.

- a- Climate systems
- b- Climate change: definition and causes
- c- Global warming

Topic 2: Climate, a historical perspective

- a- Regional and global climate changes
- b- Seasonal climatic variability: El Niño and other climatic phenomena

- c- Historical climate
- d- Climate and geography

Topic 3: Consequences of climate change in the past

- a- Effects on habitats
- b- Climate as an evolutionary force
- c- Global extinctions due to climate

Topic 4: Climatic effects on ecosystems

- a- Special distribution
- b- Adaptation
- c- Physiology
- d- Morphology

Topic 5: Adaptation and mitigation

- a- Capture (sequestration) of carbon emissions
- b- Mitigation: reducing impacts
- c- Adaptation to climate change
- d- Adaptation based on ecosystems

Topic 6: Climate change economics, policies and postures

- a- Climate change policies
- b- Country postures
- c- Resolutions from Kyoto to Paris
- d- The future of climate change policies

Topic 7: Climate Change in Costa Rica

- a- Existing laws

b- Adaptation program

c- Clean energies

d-Future vision

METHODOLOGY

The methodology is planned as experiential learning using Paolo Freire's educational guidelines, from a constructivist perspective and, the competency-based model.

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
2 Round Tables (10% each)	20%
3 Reading checks (10% each)	30%
1 Argumentative Essay	20%
Problem solving: How to solve current problems related to Climate Change	30%
Total	100%

LEARNING STRATEGIES

1.Round Tables.

A Round Table consists of a discussion of a group of people with a moderator (professor). An attempt is made to provide facts and opinions on a topic of discussion, in order to explain and understand the topic of interest.

2.Reading Checks.

Readings related to the triggers of climate change, their main impacts on habitats, and their effects on natural populations are discussed.

3.Argumentative Essay.

Argumentative essay as an academic writing allows each student to explain, interpret and evaluate one or more subjects with due justification in a formal way. The idea is to demonstrate research and the ability to write, where there is clarity in the explanation of arguments. The essay is strictly individual and authored by the student. It is assessed using the following rubric:

4. A problem solving with problem-based learning methodology (PBL)

Class work intends that the students put into practice the knowledge acquired to solve a current problem related to Climate Change with the methodology of Problem Based Learning (PBL).

It consists of the individual or group work that autonomously tries to solve a problem designed by the professor, but referenced from the context. The teacher assumes a role of support, accompaniment and monitoring of learning dynamics to ensure that sustainable solutions are achieved to today's environmental problems.

Students should use reasoning strategies to analyze the given situation and identify the knowledge, skills and aptitudes necessary to solve the problem. Finally, based on what

has been learned, identify the principles and concepts to be applied to other situations (abstract and transfer knowledge). It is considered the final project of the course.

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/Omnivox platform.

BIBLIOGRAPHY

Dessler, A. (2015). **Introduction To Modern Climate Change**. Cambridge University Press.

Hannah, L. 2014. **Climate Change Biology**. Academic Press.

Morhart, J. E. 2016. **Climate Change, Ecology, Health**. Clouddripper Press.

Pelling, M. 2010. **Adaptation To Climate Change, From Resilience To Transformation**. Taylor and Francis.

CHRONOGRAM

Week	Sub competence	Content	Teaching Strategies
1		Topic 1: Climate a) Climatic systems	Course presentation and reading of the syllabus. Introduction to topic 1
2		Topic 1: Weather a) Climatic systems b) Climate change: definition and causes	Lecture Discussion
3		Topic 1 Climate c) Global warming	Lecture and discussion and Reading Check 1
4		Topic 2 Climate, a historical perspective a) Regional and global	Lecture and discussion

	Research historical data and the use of climate models,	climate changes b) Historical climate	
5	considering aspects of climate prediction.	Topic 2: Climate, a historical perspective a) Climate and geography Seasonal climatic variability: El Niño and other climatic phenomena	Lecture and discussion
6		Topic 3: Consequences of climate change in the past Effects on habitats Climate as an evolutionary force	Lecture Round table No 1
7		Topic 3: Consequences of climate change in the past a) Global extinctions due to climate	Lecture and discussion
8		Topic 4: Climatic effects on ecosystems a) Special distribution b) Adaptation	Lecture and discussion
9		Topic 4: Climatic effects on ecosystems a) Physiology b) Morphology	Lecture Reading check 2

10	Discuss the evidence that demonstrates the importance of the antropogenic effect, considering the prevailing climate change.	Topic 5: Adaptation and mitigation a) Capture (sequestration) of carbon emissions b) Mitigation: reducing impacts	Lecture and Group discussion
11		Topic 6: Climate change economics, policies and postures a) Climate change policies b) Country postures	Lecture and discussion
12		Topic 6: Climate change economics, policies and postures a) Resolutions from Kyoto to Paris b) The future of climate change policies	Lecture and discussion Reading check 3
13		Topic 7: Climate Change in Costa Rica a) Existing laws b) Adaptation program	Round table No 2
14		Topic 7: Climate Change in Costa Rica a) Clean energies	Reading check 3 Lecture and discussion

		b) Future vision	
15		Integration of knowledge	Final project presentation Problem solving