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Climate Change:  
Science,  
Ethics &  
Society

# Climate Change: From Science to Society

## TEACHING GUIDE



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# Climate Change: From Science to Society

## Teaching Guide

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Translations of this document in Portuguese, Spanish, Italian, Greek and Turkish are available in our project website: <https://ctwoseas.eu/>

# TEACHING GUIDE

## CONTENTS

**Name of the Course:** CLIMATE CHANGE: FROM SCIENCE TO SOCIETY

**Course Credits:** 30 hour-course (3 ECTS)

### UNIT 1 (10 hours)



#### 1. Basic Scientific Concepts

- 1.1. Climate Change: Definitions.
- 1.2. Composition of the Atmosphere: Greenhouse Gases.
- 1.3 The Energy Balance of the Earth.
- 1.4. Climate controls: tectonic, orbital, millennial and historical.

#### 2. Evidence of Anthropogenic Climate Change

- 2.1. Climate Modelling.
- 2.2. Patterns and Predictions.
- 2.3. Consequences of Climate Change (e.g., sea level increase, impact on fauna and flora, extreme weather events).
- 2.4. Tools for the Study of Climate Change (e.g., satellite images).
- 2.5. Information sources about climate change (e.g., Intergovernmental Panel on Climate Change, IPCC).

## Unit II (10 hours)



1. Climate change and society: impact on economy, social relationships, demography, health, international relations.
  - 1.1. Historical overview of the interaction between humans and climate change (human evolution over the centuries).
2. History of sociological movements and ethical consciousness about climate change evidence.

## Unit III (10 hours)



1. Difficulties to tackle and solve climate change: costs and benefits/drawbacks.
2. Myths and misunderstandings on climate change and how to deal with them
  - 2.1. information management.
  - 2.2. Psychological biases.
3. Strategies for mitigation and adaptation (e.g., circular economy; carbon footprint /carbon emissions; role of individuals, policymakers, political decisions stakeholders' involvement).

## INTRODUCTION

### THE AIM OF THE TEACHING GUIDE

The main objective of this project is to develop a multidisciplinary cross-cutting course from a European perspective on climate change promoting interdisciplinary cooperation between Science, Economics, Philosophy, Ethics and Social approaches. Cross-cutting competencies are complementary to specific competences in each university Degree, and are crucial to complete the students' comprehensive training and to boost their employability. However, cross-cutting competencies often take second place in the teaching practice at the university level. Moreover, the multidisciplinary approach will allow the students to implement concepts regarding climate change from different perspectives with a pan-European vision. Taking into account that climate change is a complex and general issue, the skills and competencies gained with this course will be useful in the future career development of our students in both private business and public institutions.

The teaching guide aims to provide information on the content, methodology and results which are expected to be obtained from the course **Climate Change: Science, Ethics and Society**. The teaching guide gives detailed information about the design of student learning in terms of content and competences. To ensure that learning is centred on the student, a holistic perspective is needed that includes specific competences (know and know-how), as well as generic competences (know-how to be and knowing how to be). It also includes the methodological strategies (which are developed in detail in the IO1 - methodological guide), as well as the virtual learning space (IO4).

The teaching guide is the document that outlines key elements that will be covered in the cross-cutting subject. The main innovative aspect in the syllabus will be its pan-European vision and its cross-sectional view of the climate change issue. Once produced, this document will be accessible to all educational communities not only in the EU but worldwide since it will be freely downloadable from our web pages and will be published on the platform. It is expected that this teaching guide will be beneficial for both teachers and students, and will reach a wider audience.

## **SYLLABUS GRID**

The course syllabus has been prepared in order to present learners (undergraduate students) with a global perspective on climate change and the effect on anthropogenic and environmental systems. Most of the decisions that affect climate change are taken by individuals, officials, and governments at local, regional, or national levels. For this reason, the use of local examples or case studies are encouraged.

### **Learning objectives**

At the end of this course, students are expected to:

- approach the topic with an open mind, as climate change is a transversal subject that runs in all sorts of studies in the University.
- learn to think independently and have their own well-argued opinions, expressing their views with respect to others.
- expand their knowledge with further readings, conducting research in an autonomous way.
- gain a deep knowledge of climate change and the difficulty of coordinating diverse people's interests.
- achieve a greater appreciation of the world's growing interconnectedness, including the ability to see one's own culture, one's own problems or one's own country through the eyes of others and develop a new understanding of humans' place in the world.

Regarding **unit I**, the overall aim is to offer the students the basics of the established scientific facts about climate change to enable them to fully understand the factual evidence on which the course will be sustained. By addressing this topic under this approach, we are tackling the problem of misunderstandings on climate change that undermine people's commitment with the fight against fake news and unwarranted, non-scientifically based claims.

The general aim of **unit II** is to raise students' awareness about the impact of climate change on people's everyday life, surpassing and refuting preconceived ideas of climate change mainly affecting faraway places like the Poles. Therefore, by shedding light on this, this unit

brings the problem home, underlining, through history, how and when climate change affects our society, territories and individual lives.

**Unit III** highlights people's difficulties to engage in the fight against climate change. Therefore, it provides students with strategies on how to effectively communicate about climate hazards in order to overcome the psychological, cognitive and behavioural biases that hinder active commitments to climate change. In addition, it focuses on resilience and sustainability strategies to apply in people's daily life.

<b>Syllabus Grid: Climate Change: From Science to Society</b>	
<b>Topic</b>	<b>Learning Outcomes</b>
	<b>Students should be able to:</b>
Basic scientific concepts	<ul style="list-style-type: none"> <li>● Acknowledge basic scientific concepts related to climate change</li> <li>● Recognise the evidence of climate change</li> </ul>
Evidence of anthropogenic climate change	<ul style="list-style-type: none"> <li>● Acknowledge scientific evidence of climate effects</li> <li>● Interpret correctly the IPCC reports</li> <li>● Analyse the evidence of the impacts of climate change on environmental systems and human activities</li> <li>● Understand and analyse the social, cultural, legal and ethical consequences of scientific progress on human life, animal life and the ecosystem as a whole</li> </ul>
Difficulties to tackle and solve climate change	<ul style="list-style-type: none"> <li>● Become aware of the difficulties in communication about climate change</li> <li>● Become more sensitive to the need of precise communication about climate change</li> </ul>
Myths and misunderstandings on climate change and how to deal with them	<ul style="list-style-type: none"> <li>● Become aware of the biases that hinder effective action regarding climate change</li> </ul>

Strategies for mitigation and adaptation	<ul style="list-style-type: none"> <li>• Develop teamwork skills, in an interdisciplinary way, promoting plural dialogue and the recognition of diversity.</li> <li>• Construct arguments on climate change effectively</li> <li>• Design and implement solutions/plans to mitigate the impact of human activity on climate change</li> <li>• Communicate effectively about climate change</li> </ul>
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## **METHODOLOGY - an overview**

This section will provide an overview of the contents that are analysed in more detail in the methodological guide. Methodology is crucial in any teaching/learning context. As such, to convey learning contents in a rather effective way and to get the students to adhere to the activities or tasks performed, it is of paramount importance to carefully plan the lesson, taking into account teaching procedures based on effective methodologies that meet the learners' needs and expectations.

Students are not expected to have an accurate and deep knowledge on climate change. There will be active learning which will encourage students' active participation in the process. Active learning strategies include a mixture of individual and collaborative tasks, group work, debates which allow the students to reflect on the outcomes, share and discuss their ideas with peers. They will be encouraged to make connections between their prior knowledge and new concepts.

## **Teaching and learning methods**

The course syllabus can be carried out through

1. lectures by the teacher on the topics followed by discussion/debates after the reading of documents and audio-visual material.
2. individual research on the topics by the students
3. support and supervision of the students' work
4. assigned tasks to students who will be working collaboratively (pair/group work)
5. project-based learning

For more specific methods/techniques/strategies/ activities follow [this link](#) (pdf file).

### **Course planning**

Initial questionnaire assessing knowledge and attitudes towards climate change and related issues.

Find [here](#) an example of Background and attitudinal questionnaire.

If relevant, the course plan should be adjusted according to the results of the initial questionnaire.

### **Daily Lesson Planning**

As with all planning, the format of lesson plans may vary from institution to institution.

Regardless of the format, here are some key components of a lesson planning:

- The lessons should be readable and detailed enough that a lecturer could teach from them in an emergency.
- Consider making a copy or two of each week's plan.
- Draw your plan in a logically sequenced way and make sure the lesson plan is clear, well-organised regarding time management, and in accordance with the level and needs of the course and the students.
- Balance grouping strategies and activities in each learning style or multiple intelligence type so you are meeting the needs of all your students.

## EVALUATION

The evaluation will be carried out to test the attainment of the proposed competences. It may include the following items:

- Attendance and attention
- Active participation and generating ideas
- Structured group interview
- Self-evaluation/ peer-evaluation
- Creation of synergies within the community of practice (upload an article/essay about your country's environmental state in the community of practice; recommend suggested bibliography on climate change)
- Objective tests and questionnaires (e.g. short answer, multiple choice, reflective questions)
- Preparation of a case study/ short report / essay on a research question / problem\*

\*Examples of problems/ questions raised:

Research topic 1: Recycling. Research Questions: Why do we recycle? What are the environmental benefits? What are the costs of recycling? Why are people so reluctant to recycle? What can be done to change people's mindset regarding recycling?

Research topic 2: Air conditioning. Research questions: Why do we keep using air conditioning? How harmful is air conditioning to the environment?

Research topic 3: Renewable, nuclear and fossil energy. Research questions: How efficient is fossil energy compared to other energy sources? What behavioural changes regarding energy saving could you implement in your daily life?

## THE AGENDA

*The agenda should be adapted to each Country where the subject is taught.*

*Our advice:*

- *run the course at least in the 2nd year of an undergraduate degree;*
- *limit the number of students in class to no more than 20, whenever possible;*
- *this can also be offered as an extra course unit.*

## THE PROJECT PLATFORM

[www.c2seas.eu](http://www.c2seas.eu)

## SUGGESTED REFERENCES (also indicated in the project platform)

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**NB:** These guidelines are not meant to be constraining in the sense they should be strictly followed. Nonetheless, they will be helpful for the lecturers to know how to approach the topics and delve into different possibilities available within this specific area.