



Spain Center for International Education

# Pre-University Summer School



Spain Center for International Education

## SYLLABUS 2023

### 1. COURSE TITLE

A Multidisciplinary Approach to Climate Change

#### 1.1. Course number

MACC-23

#### 1.2. Content area

Art, Biology, Business, Chemistry, Earth Sciences, Economics, Engineering, Geography, Humanities, Law, Marketing, Physics, Political Science, Psychology, Sociology

#### 1.3. Course level

Undergraduate

#### 1.4. Language

English

#### 1.5. Prerequisites

None

#### 1.6. Minimum attendance requirement

Attendance is mandatory. Minimum attendance to pass the course is 80%.



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### 1.7. Faculty data

**Director: Pedro García, EngD**

Director of SpaCIE - Spain Center for International Education

**Complete list of professors and relevant biography (in alphabetical order of last name):**

- **Miguel Buñuel:** Associate Professor and Director of the Summer School of Economics and Business, Faculty of Economics and Business Studies, UAM. Doctor in Energy and Environmental Studies (Boston U), Doctor in Economic and Business Sciences (UAM), Master's degree in Economics (Boston U), Bachelor's degree in Law (UAM), Bachelor's degree in Economic and Business Sciences (UAM). Other relevant facts: He was advisor of Spain's Minister for the Environment, 'father' of the Spanish Office for Climate Change, which was created at his proposal. He represented the Kingdom of Spain at the negotiation table of the 6<sup>th</sup> Conference of the Parties of the United Nations Framework Convention on Climate Change.
- **Cristina Carrillo:** Director for Responsible Banking in Santander Consumer Finance Europe. Bachelor's degree in Business Administration (Universidad Carlos III), Master's degree in International Finance (CUNEF), Executive Master's degree in Human Resources (Garrigues). Other relevant facts: she has been working in Santander Consumer for 8 years, coordinating since 2018 the implementation of the Responsible Banking strategy (Sustainability and Culture strategy) in 14 European countries.
- **Nagore García:** Assistant Professor, Faculty of Science, UAM. Doctor in Evolutionary Biology and Biodiversity (UAM), Bachelor's degree in Environmental Sciences (UAM). Other relevant facts: She was the main researcher of the project SoilSkin (The Living Skin of the Soil: A citizen science programme to evaluate the vulnerability of ecosystems and their functions in front of global change).
- **Eduardo Gonzalo:** Assistant Professor, Lehigh University, USA. Doctor in Phenomenology of String Theory (Institute of Theoretical Physics and Faculty of Sciences, UAM). Other relevant facts: Scientific advisor in the Youtube channel 'Dr. What?' and scientific advisor in the Youtube channel 'Quantum Fracture'.



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- Noemí de Haro: Associate Professor, Faculty of Philosophy and Humanities, UAM. Doctor in Art History (UCM), Master's degree in Museology (U Granada), Bachelor's degree in Art History (U de Córdoba), Higher Professor of Viola (Conservatorio Superior de Música de Córdoba). Other relevant facts: She is a member of the research group 'Discourses, genealogies and practices in contemporary visual creation'.
- Emilio de las Heras: Independent Researcher, expert in international finance. He writes in his Blog of the financial newspaper EXPANSION, with more than 700 articles on climate change, clean technologies, fiscal policies, and energy transition. He also writes in Fundación Renovables, Fundación Alternativas and Agenda Pública-El País. He has given more than 70 lectures and courses about the climate emergency and how to prevent it. He is a Naval Architect and Marine Engineer by the Universidad Politécnica de Madrid, PDG by IESE University of Navarra, and Master in Business Administration by the University of Chicago-Booth. He started his career in Empresarios Agrupados in nuclear power plants. Soon, he moved to Banco de Crédito Industrial, Banco de Negocios Argentaria, Banco Exterior de España, and BBVA, where he was Head of the BBVA New York Office.
- Jesús Marcos Gamero: Associate Professor in "Global Environmental Challenges", Faculty of Social Sciences and Law, and researcher at the 'Sociology of Climate Change and Sustainable Development' Research Group, UC3M. Doctor in Social Analysis (UC3M), Master of Law at the Irish Centre for Human Rights (NUI), and Bachelor's degree in Political Science (UCM). Other information of interest: His main area of research focuses on socioeconomic impacts of climate change, like inequality, health, or migration among others.
- Raúl Martín: Associate Professor, Faculty of Teacher Training and Education, UAM. Doctor in Geography (UAM). Other relevant facts: He is a member of PANGEA Research Group, a multidisciplinary group that studies natural aspects (geomorphology, hydrology, natural landscapes, geodiversity) and social aspects (demography, tourism, sustainable development, valuation of elements and management of the natural heritage), as well as the control of geomorphological processes or elements and the application of geomatic and geophysical techniques.



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- **Lucía Muñoz:** Head of Climate Action Project and Analysis, Direction of Energy Policies & Climate Change, Iberdrola. Industrial Engineer (UPM), Doctor in Environmental Models (U Pontificia Comillas). Other relevant facts: specialized in Electricity Generation Technologies, Energy Management and Environment, she has been working in the energy sector for more than 25 years; she has recently moved inside Iberdrola, a global energy company based in Spain, to the Climate Change area with the aim to accelerate the different stakeholders' awareness on Climate action inside and outside the company.
- **Peter Sweatman:** CEO of Climate Strategy & Partners, a strategic consulting group in Clean Energy, Clean Technology Innovation and Energy Efficiency that works with leading companies and policymakers in the global energy transition. He is also Chairman of Energy Efficiency Capital Advisors, an expert solution provider and structuring agent for over Euro 30 million of finance for energy savings and on-site power in Spanish cities. MA Cantab degree in Engineering and Management Studies (Cambridge U). Other relevant facts: He has spent 26 years in finance of which 16 are climate finance and energy efficiency. He is a founder advisor to the Climate Bond Initiative, an active member of the Ashoka Support Network, a member of the Network for Sustainable Financial Markets, advisor to the Climate Lab, Braemar Energy Ventures, rapporteur for EU Commission and UNEP FI's EEFIG and G20's EEFTG, member of the steering committee of the Global Alliance for Energy Productivity, Build-Upon and the Investor Confidence Project Europe and visiting lecturer at IIT-Comillas university, IE University IMBA programme and European University Institute.

### 1.8. Course objectives

#### A) Introduction

Climate change is the main global environmental problem and one of the main economic and social problems facing humanity. And citizens increasingly perceive it as such. For example, the latest Eurobarometer survey, published in 2021 by the European Commission, shows that 93% of EU citizens believe that climate change is a serious problem, and 78% that it is a very serious problem. Moreover, compared to the previous Eurobarometer, published in 2019, climate change has overtaken poverty, hunger, and lack of clean water as the most serious problem facing the world.



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On the other hand, climate change is a multidimensional problem that must be studied from all disciplines of knowledge. However, our curricula do not usually offer a multi- or interdisciplinary understanding of the problem. Furthermore, although the population perceives it as a very serious problem, there is a notable lack of knowledge about its nature, effects, possible scenarios, policies, and responses to the challenge it poses for humanity.

### B) Objectives

The main objective of this course is to alleviate the shortcomings of our curricula and the lack of knowledge of a large part of the population mentioned in the introduction. To this end, the course offers a multidisciplinary and rigorous vision of the problem of climate change. Experts in each subject offer this comprehensive, university-level vision. Although academically rigorous, their classes are adapted to the necessary introductory level. This is necessary given the heterogeneous profile that students will have.

In addition to the main objective described in the previous paragraph, the course has other secondary objectives:

- To provide a first exposure to introductory level university courses from multiple disciplines, which can help students in their decision making about their future university studies.
- For non-native English speakers, to reinforce students' academic skills in English, contributing to their training to study university courses in English.
- For students not residing in Spain, to provide an enriching "study abroad" experience, with all the benefits of academic, cultural, and personal enrichment that this type of experience provides.

### 1.9. Course contents

The course contents (and the areas of knowledge or disciplines that each subject deals with) are the following:

1. What is Climate Change? Earth's Energy Balance and Greenhouse Gases (Physics, Earth Sciences, Chemistry)



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2. Science Consensus: Why we know that we are to blame (Physics, Earth Sciences)
3. Feedbacks, tipping points, and future global climate (Physics, Earth Sciences)
4. Impacts on Physical Systems (Earth Sciences, Geography)
5. Consequences of Climate Change on Cities, Settlements and Key Infrastructure & Adaptation (Geography, Economics)
6. Consequences of Climate Change on Biological Systems & Adaptation (Biology, Earth Sciences)
7. Sociology of Climate Change (Sociology, Psychology)
8. Art and Climate Change (Art, Humanities)
9. Science Consensus and the Climate Change Debate (Interdisciplinary)
10. International Response to Climate Change (Political Science, Law, Economics)
11. Introduction to Climate Change Policy (Economics, Political Science, Law)
12. Mitigation Strategies (Engineering, Economics, Business)
13. From Mitigation Strategies to Policy (Economics, Political Science)
14. Climate Change and Business (Business, Finance)
15. Conclusions: The Transition to Net Zero by 2050 (Interdisciplinary)

### 1.10. Course bibliography

All materials will be made available through the Program's web platform.





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### 2. Teaching methodology

Teaching activities requiring students' attendance will be the following:

1. Lectures and experimental sessions: Lectures will be based upon the materials provided to students, and PowerPoint presentations. Lectures will be combined with experimental sessions, which will apply some of the concepts presented in the former. Participation will be strongly encouraged.
2. Guest lectures, visits to institutions and field trips.
3. Optional: Non-compulsory sessions with one or several students during office hours.

Students' activities not requiring attendance will be the following:

1. Personal study for preparing lectures and the exam.
2. A multiple-choice take-home exam, which will be delivered electronically through the Program's web platform.

### 3. Student workload

ACTIVITIES	HOURS	ECTS	%
<b>With attendance</b>	<b>30</b>	<b>1.20</b>	<b>40.00</b>
Lectures, experimental sessions, guest lectures, visits to institutions and field trips	30	1.20	40.00
<b>With no attendance</b>	<b>45</b>	<b>1.80</b>	<b>60.00</b>
Personal study	43	1.72	57.33
Multiple-choice take-home exam	2	0.08	2.66
<b>TOTAL</b>	<b>75</b>	<b>3.00</b>	<b>100.00</b>



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### 4. Evaluation procedures and weight of components in the final grade

PROCEDURE	% GRADE
Attendance and participation	50.00
Multiple-choice take-home exam	50.00
<b>TOTAL</b>	<b>100.00</b>