



University of  
New Haven

## *Introduction to Global Climate Change*

### SECTION I: Course Overview

**Course Code:** ENV320CDG

**Subject Area(s):** Environmental Science

**Prerequisites:** See Below

**Language of Instruction:** English

**Total Contact Hours:** 45

**Recommended Credits:** 3

### COURSE DESCRIPTION

This course provides an overarching introduction to the causes and consequences of Earth's recent anthropogenic climate change and its intersection with environmental, social, economic, and geopolitical issues.

When looking at possible human responses to this anthropogenic climate change, the key variables in modeling different scenarios for Earth's future climate are demographics, choice of energy resources, land use, and politico-economic decisions. For each scenario, this course will illustrate the consequences of climate change with a specific focus on these global issues.

Class sessions will examine foundational physical processes that determine the Earth's climate and demonstrate how former civilizations, flora, and fauna adapted to previous non-anthropogenic changes in climate. Further investigation will examine the connections between the industrial revolution, demographic evolution, and rising living standards, powered by the ever-increasing use of fossil fuels. Further, students will synthesize the link between climate change and other environmental challenges – such as access to water, preservation of biodiversity, plastics, and carbon emissions. Students will also analyze empirical observations on trends in Earth's rising average temperature; debate about climate change-related topics including their social impact and challenges of communication; and investigate current and potential climate policies, initiatives, and international political responses.

### LEARNING OBJECTIVES

Upon successful completion of this course, you will be able to:

- Recognize the difference between natural and anthropogenic climate variations.
- Distinguish between various future climate scenarios in reference to the complex interaction between climate, environment, energy policies, and demographics.

- Synthesize the connection between climate change and other major 21<sup>st</sup> century challenges
- Critically assess communication on climate change-related topics.

## PREREQUISITES

Prior to enrollment, this course requires you to have a sound interest in this transverse topic. A specific background is not required in Environmental Sciences. The course will cover topics related to science, engineering, economics, as well as political and social sciences. You are thus expected to show the intellectual flexibility required.

## SECTION II: Instructor & Course Details

### INSTRUCTOR DETAILS

<b>Name:</b>	TBA
<b>Contact Information:</b>	TBA
<b>Term:</b>	SEMESTER

### ATTENDANCE POLICY

This course will meet one time weekly for 150 minutes each session for a total of 15 class sessions. In addition to class sessions, a visit to the IPCC offices in Paris Saclay or a conference is foreseen. All students are expected to arrive on time and prepared for the day's class session.

CEA enforces a mandatory attendance policy. You are therefore expected to attend all regularly scheduled class sessions, including any field trips, site visits, guest lectures, etc. that are assigned by the instructor. The table below shows the number of class sessions you may miss before receiving a grade penalty.

ALLOWED ABSENCES – SEMESTER		
Courses Meeting X day(s) Per Week	Allowed Absence(s)	Automatic Failing Grade at X <sup>th</sup> Absence
Courses meeting 1 day per week	1 Absence	4 <sup>th</sup> Absence

For every additional absence beyond the allowed number, your final course grade will drop down to the subsequent letter grade (ex: A+ to A). As a student, you should understand that the grade penalties will apply if you are marked absent due to tardiness or leaving class early. In the table below, you will find the grade penalty associated with each excessive absence up to and including automatic course failure.

ATTENDANCE DOCKING PENALTIES				
Absence	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
Penalty	No Penalty	0.5 Grade Docked	1 Grade Docked	Automatic Failure
HIGHEST POSSIBLE GRADE AFTER ATTENDANCE PENALTIES				
Grade	A+	A	A-	F

CEA does not distinguish between excused and unexcused absences. As such, no documentation is required for missing class. Similarly, excessive absences, and the grade penalty associated with each, will not be excused even if you are able to provide documentation that shows the absence was beyond your control. You should therefore only miss class when truly needed as illness or other unavoidable factors may force you to miss a class session later on in the term.

## GRADING & ASSESSMENT

The instructor will assess your progress towards the above-listed learning objectives by using the forms of assessment below. Each of these assessments is weighted and will count towards your final grade. The following section (Assessment Overview) will provide further details for each.

<b>Class Participation</b>	<b>10%</b>
<b>Project</b>	<b>30%</b>
<b>Midterm Exam</b>	<b>30%</b>
<b>Final Exam</b>	<b>30%</b>

The instructor will calculate your course grades using the CEA Grading Scale shown below. As a CEA student, you should understand that credit transfer decisions—including earned grades for courses taken abroad—are ultimately made by your home institution.

CEA GRADING SCALE			
Letter Grade	Numerical Grade	Percentage Range	Quality Points
A+	9.70 – 10.0	97.0 – 100%	4.00
A	9.40 – 9.69	94.0 – 96.9%	4.00
A-	9.00 – 9.39	90.0 – 93.9%	3.70
B+	8.70 – 8.99	87.0 – 89.9%	3.30
B	8.40 – 8.69	84.0 – 86.9%	3.00
B-	8.00 – 8.39	80.0 – 83.9%	2.70
C+	7.70 – 7.99	77.0 – 79.9%	2.30
C	7.40 – 7.69	74.0 – 76.9%	2.00
C-	7.00 – 7.39	70.0 – 73.9%	1.70
D	6.00 – 6.99	60.0 – 69.9%	1.00
F	0.00 – 5.99	0.00 – 59.9%	0.00

W	Withdrawal	N/A	0.00
INC	Incomplete	N/A	0.00

## ASSESSMENT OVERVIEW

This section provides a brief description of each form of assessment listed above. Your course instructor will provide further details and instructions during class time.

**Class Participation (10%):** Student participation is mandatory for all courses taken at a CEA Study Center. The instructor will use the rubric below when determining your participation grade. All students should understand that attendance and punctuality are expected and will not count positively toward the participation grade.

CLASS PARTICIPATION GRADING RUBRIC	
Student Participation Level	Grade
You make major & original contributions that spark discussion, offering critical comments clearly based on readings, research, & theoretical course topics.	<b>A+</b> (10.0 – 9.70)
You make significant contributions that demonstrate insight as well as knowledge of required readings & independent research.	<b>A/A-</b> (9.69 – 9.00)
You participate voluntarily and make useful contributions that are usually based upon some reflection and familiarity with required readings.	<b>B+/B</b> (8.99 – 8.40)
You make voluntary but infrequent comments that generally reiterate the basic points of the required readings.	<b>B-/C+</b> (8.39 – 7.70)
You make limited comments only when prompted and do not initiate debate or show a clear awareness of the importance of the readings.	<b>C/C-</b> (7.69 – 7.00)
You very rarely make comments and resist engagement with the subject. You are not prepared for class and/or discussion of course readings.	<b>D</b> (6.99 – 6.00)
You make irrelevant and tangential comments disruptive to class discussion. You are consistently unprepared for class and/or discussion of the course readings.	<b>F</b> (5.99 – 0.00)

**Project (30%):** You'll write a paper on a climate change related topic (e.g. climate policies in your state, critical analysis of a climate change related book, working out in detail a future climate scenario, detailed description of renewable or low carbon energy, etc.) and present this in class. Further information will be provided regarding format and content expectations.

**Midterm Exam (30%):** The midterm exam is designed to establish and communicate to you the progress you are making towards meeting the course learning objectives listed above. This assessment is a 30-minute long exam with short questions that evaluates your understanding of the concepts of climate change.

**Final Exam (30%):** The final exam will take the full allotted course time where you will read a recent newspaper article on climate change that you will critically analyze.

## REQUIRED READINGS

Reading assignments for this course will come from the required text(s) and/or the selected reading(s) listed below. All required readings—whether assigned from the text or assigned as a selected reading—must be completed according to the due date assigned by the course instructor.

- I. SELECTED READING(S):** The selected readings for this course are listed below. You will not need to purchase these readings; the instructor will provide these selected readings to you in class (either in paper or electronic format).

S.T. 1: Emanuel, Kerry. *What we know about climate change* MIT press, 2018.

S.T. 2: Intergovernmental Panel on Climate Change (IPCC): *Climate Change 2014 Synthesis report: Summary for Policy Makers*:  
[https://www.ipcc.ch/site/assets/uploads/2018/02/AR5\\_SYR\\_FINAL\\_SPM.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf)

S.T. 3: DiMento, Joseph and Doughman, P. *Climate Change: What It Means for Us, Our Children, and Our Grandchildren* MIT press, 2014

S.T. 4: MIT: *Food Water Energy Climate Outlook 2018*  
<https://globalchange.mit.edu/sites/default/files/newsletters/files/2018-JP-Outlook.pdf>

S.T. 5: IPCC Climate change 2014: Chapters 11 & 12: Near-term and Long-term Climate Change: Projections, Commitments and Irreversibility.

S.T. 6: The Economics of Climate Change, A Primer:  
<https://www.cbo.gov/sites/default/files/108th-congress-2003-2004/reports/04-25-climatechange.pdf>

S.T. 7: WWF impact of climate change on the environment:  
<https://www.worldwildlife.org/pages/living-planet-report-2018>.

S.T. 8: International Energy Agency: *World Energy Outlook 2017*: <https://www.iea.org/weo2017/>

S.T. 9: ExxonMobil: *Outlook for Energy, A perspective to 2040*: <https://corporate.exxonmobil.com/-/media/Global/Files/outlook-for-energy/2019-Outlook-for-Energy.pdf>

S.T. 10: EU report on Novel Carbon Capture and Utilisation Technologies:  
[https://ec.europa.eu/research/sam/pdf/sam\\_ccu\\_report.pdf](https://ec.europa.eu/research/sam/pdf/sam_ccu_report.pdf)

S.T. 11: Alverson, Keith. *Understanding Future Climate Change Using Paleorecords*. Global Climate pp. 153-185

S.T. 12: Ludlow, Francis. *STEAM Approaches to Climate Change, Extreme Weather and Social-Political Conflict* The STEAM Revolution pp. 33-65

S.T. 13: Timeline of Climate Change Conventions: <https://unfccc.int/timeline/>

S.T. 14: Romps, David and Jean Retzinger. *Climate news articles lack basic climate science*.  
<http://romps.berkeley.edu/2018/media/18media.pdf>

## RECOMMENDED READINGS & RESOURCES

The recommended reading(s) and/or text(s) for this course are below. These recommended readings are not mandatory, but they will assist you with research and understanding course content.

Emmanuel, Kerry. *Climate Science and Climate Risk: A Primer*, 2016  
[ftp://texmex.mit.edu/pub/emanuel/PAPERS/Climate\\_Primer.pdf](ftp://texmex.mit.edu/pub/emanuel/PAPERS/Climate_Primer.pdf)

Intergovernmental Panel on Climate Change (IPCC): <https://www.ipcc.ch/>

*The instructor reserves the right to make changes or modifications to this syllabus as needed*

International Energy Agency: World Energy Outlook, 2018:  
<https://www.ica.org/media/presentations/WEO2018-Presentation.pdf>

NASA Evidence for Climate Change: <https://climate.nasa.gov/evidence/>

Past Global Changes, University of Bern: <http://www.pages-igbp.org/>

Smit, Berend, et al. *Introduction to Carbon Capture and Sequestration*. Imperial College Press, 2014

UN climate change reports: <https://www.un.org/en/climatechange/reports.shtml>

United Nations. *Population 2030 Demographic challenges and opportunities for sustainable development planning*, 2015:  
<https://www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf>

## ADDITIONAL RESOURCES

In order to ensure you success abroad, CEA has provided the academic resources listed below. In addition to these resources, each CEA Study Center provides students with a physical library and study areas for group work. The Academic Affairs Office at each CEA Study Center also compiles a bank of detailed information regarding libraries, documentation centers, research institutes, and archival materials located in the host city.

- **UNH Online Library:** As a CEA student, you will be given access to the online library of CEA's School of Record, the University of New Haven (UNH). You can use this online library to access databases and additional resources while performing research abroad. You may access the UNH online library [here](#) or through your MyCEA Account. You must comply with UNH Policies regarding library usage.
- **CEAClassroom – Moodle:** CEA instructors use Moodle, an interactive virtual learning environment. This web-based platform provides you with constant and direct access to the course syllabus, daily schedule of class lectures and assignments, non-textbook required readings, and additional resources. Moodle includes the normal array of forums, up-loadable and downloadable databases, wikis, and related academic support designed for helping you achieve the learning objectives listed in this syllabus.

During the first week of class, CEA academic staff and/or faculty will help you navigate through the many functions and resources Moodle provides. While you may print a hard copy version of the syllabus, you should always check Moodle for the most up-to-date information regarding this course. The instructor will use Moodle to make announcements and updates to the course and/or syllabus. It is your responsibility to ensure that you have access to all Moodle materials and that you monitor Moodle on a daily basis in case there are any changes made to course assignments or scheduling.

To access Moodle: Please log-in to your MyCEA account using your normal username and password. Click on the "While You're Abroad Tab" and make sure you are under the "Academics" sub-menu. There you will see a link above your schedule that says "View Online Courses" select this link to be taken to your Moodle environment.

**COURSE CALENDAR**  
*Introduction to Global Climate Change*

SESSION	TOPIC	ACTIVITY	READINGS & ASSIGNMENTS
1	<b>Course Introduction:</b> Syllabus & classroom policies  <b>Introduction to the Earth's Climate</b>	Discussion in class	<b>Reading:</b> S.T. 1 Chapter 2 & 3 (pp. 13-38 )
2	<b>The Scientific Facts of Climate Change:</b> Observations up to today	Discussion in class	<b>Reading:</b> S.T. 1 Chapter 4 (pp. 39-50), S.T. 2 (pp. 1-32) S.T. 3 Chapter 2, 3, 4 (pp. 15-148)
3	<b>Late Modern World History:</b> Impact of the industrial revolution Evolution of the world's demography & living standards  <b>Future Energy &amp; Food Demands</b>	Discussion in class	<b>Reading:</b> S.T. 4 (pp. 1-48)
4	<b>Predictive Models for the Earth's Future Climate:</b> The different scenarios	Discussion in class	<b>Reading</b> S.T. 5 Chapter 11 (pp. 959-1014), Chapter 12 (1031-1120)
5	<b>Economics of Climate Change</b>	Discussion in class	<b>Reading:</b> S.T. 6 (pp. 23-42)
6	<b>Geopolitical, Social, &amp; Environmental Consequences of Climate Change</b>	Discussion in class	<b>Reading:</b> S.T. 1 Chapter 5 (pp. 51-62)
7	<b>Other Environmental Challenges of the 21<sup>st</sup> Century:</b> Access to water & preservation of biodiversity, plastics, aspects in common with climate change	Discussion in class	<b>Reading:</b> S.T. 7 (pp. 10-63)
8	<b>The Future of Energy I:</b> Low carbon energies	Discussion in class	<b>Reading:</b> S.T. 8 (pp. 1-19) S.T. 9 (pp. 4-47)
9	<b>The Future of Energy II:</b> Carbon Capture Utilization and Storage (CCUS)	Discussion in class	<b>Reading:</b> S.T. 10 (pp. 35-51)
10	<b>MIDTERM EXAM</b> <b>Project Presentations</b>		

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11	<b>The Adaptation of Fauna, Flora, and Civilizations to Previous Climate Changes</b>	Discussion in class	<b>Reading:</b> S.T. 11 (pp. 153-185) S.T. 12 (pp. 33-65)
12	<b>The COPs:</b> History, impact and milestones	Discussion in class	<b>Reading:</b> S.T. 13 (slides 1-44)
13	<b>The Major Climate Policies &amp; Initiatives in the World Today</b>	Discussion in class	<b>Reading:</b> S.T. 1 Chapter 8 (pp. 85-94) S.T. 3 Chapter 5 (pp. 149-226)
14	<b>The Communication &amp; the Sociology of Climate Change</b>	Discussion in class	<b>Reading:</b> S.T. 14 (pp. 1-9) S.T. 1 Chapter 6 (pp. 63-72) S.T. 3 Chapter 6 (pp. 227-256)
15	<b>Visit (IPCC in Paris-Saclay) or conference</b>		
16	<b>FINAL EXAM (cumulative)</b>		

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## SECTION III: CEA Academic Policies

The policies listed in this section outline general expectations for CEA students. You should carefully review these policies to ensure success in your courses and during your time abroad. Furthermore, as a participant in the CEA program, you are expected to review and understand all CEA Student Policies, including the academic policies outlined on our website. CEA reserves the right to change, update, revise, or amend existing policies and/or procedures at any time. For the most up to date policies, please review the policies on our website.

Class & Instructor Policies can be found [here](#)

General Academic Policies can be found [here](#)