

Queens College CUNY Common Core Course Submission Form—Scientific World (SW)

Please use one form per course proposal.

All courses submitted for the Common Core must be liberal arts courses. Courses may be submitted for only one area of the Common Core and must be 3 credits. STEM waiver courses do not need to be approved by the Common Core Course Review Committee. The form should not be used for STEM waiver courses.

Instructions:					
1. Please save this document with the following file name: <div style="display: flex; justify-content: space-between; align-items: center;"> <discipline>_<number>_Proposal.doc for example: </div> French_41_Proposal.doc					
2. Please provide a sample syllabus (using the provided template) with the following file name: <div style="display: flex; justify-content: space-between; align-items: center;"> <discipline>_<number>_Syllabus.doc for example: French_41_Syllabus.doc </div>					
3. Send the proposal and the syllabus as an email attachment to the Academic Senate Administrative Coordinator, Brenda Salas (brenda.salas@qc.cuny.edu) and she will forward it to the UCC.					
Name and Email of Primary Contact	Stephen Pekar Stephen.pekar@qc.cuny.edu				
Course Prefix and Number (e.g., ANTH 101, if number not assigned, enter XXX)	GEOL 078				
Course Title	Climate change: What it means to us and what you can do about it				
Department(s)	School of Earth and Environmental Sciences				
Discipline	Geology	Credits:	3	Contact Hours	3
Pre-requisites (if none, enter N/A)	N/A				
Co-requisites (if none, enter N/A)	N/A				
Catalogue Description	GEOL078 – Climate change: what it means to us and what you can do about it 3 hrs, 3 cr. This is an introductory course that will explore the science behind climate change, how climate change is affecting our planet today, how it will affect the world and society in the coming decades, and the politics of				

	climate change. Learn what individuals, communities, countries and the world are accomplishing to combat the climate crisis and what each of us can do to create a better world.
For what majors, if any, does this course satisfy a requirement?	None
Note any interdisciplinary programs (e.g., <i>Africana Studies</i>, <i>Women & Gender Studies</i>, etc.) for which this course may satisfy a requirement.	None
If this course is regularly co-listed, please indicate the course(s) here, and whether the other course(s) meet general education requirements.	NA
Sample Syllabus	Syllabus Template Follows this form
<p>Indicate the status of this course being nominated:</p> <p><input type="checkbox"/> current course <input type="checkbox"/> revision of current course X<input type="checkbox"/> a new course being proposed</p> <p>Check below if applicable:</p> <p><input type="checkbox"/> This is a Capstone Course <input type="checkbox"/> This is a Synthesis course <input type="checkbox"/> This is already a "W" course <input type="checkbox"/> Seeking "W" designation</p>	

Learning Outcomes

In the left column explain the course assignments and activities that will address the learning outcomes in the right column.

E. Scientific World

A Flexible Core course must meet the three learning outcomes in the right column.

This class will have students gather information about climate change that includes learning how they can calculate their own carbon footprint and ecological footprint.

The students will interpret graphs, tables and figures about various aspects of climate change and how it will affect them, society and the planet.

The students will also read articles and examine figures and data about climate change from the IPCC reports, peer-reviewed articles about climate change, and articles from the news.

Written assignment: Calculating your carbon footprint –

Students will calculate their carbon footprint using an online tool (<https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/>).

They will interpret the information and then compare their footprint to what is needed to curb greenhouse gas emissions. They will read a variety of sources (i.e., IPCC, Nature & Science, etc.). The students will write up a summary in which they will assess what their footprint means for climate change and what things they could change to improve their carbon footprint. See appendices at the end of class syllabus and schedule.

Assessment: Students will be graded on their ability to understand fundamental concepts about climate and what their footprints mean for combatting climate change.

Written assignment: Students will calculate their ecologic

footprints- They will also calculate their ecologic footprint and interpret and interpret the information they have gathered about the amount of resources they use in their daily life, which will provide when their footprint overshoots the Earth's resources. The students will compare these data to a variety of sources to assess how their footprint is affecting the world. **Assessment:** Students will be graded on their ability to understand fundamental concepts about climate and what their footprints mean for safe guarding earth's resources. See appendices at the end of class syllabus and schedule.

Written assignment: Students will calculate their water

footprint – Students will calculate their water footprint and learn

- FC 1: Gather, interpret, and assess information from a variety of sources and points of view.

<p>how it contributes to environmental issues. They will compare their results to other Americans and to citizens of other countries. They will also determine how they can reduce their individual water footprint as well as how local and state governments can conserve our water resources. Assessment: Students will be graded on their ability to understand fundamental concepts about climate and what their water footprints mean for water security. See appendices at the end of class syllabus and schedule.</p> <p>Examples done in class</p> <p>Class meeting 3: examine tables of present-day atmosphere content, determine CO₂ levels from graphs at various years, explore the vertical structure & temperature changes of the atmosphere looking at figures of the composition and structure of Earth's atmosphere.</p> <p>Class meeting 4: gather information about heat conductivity and capacity and explore what that means for various substances (e.g., air, water, etc.). explore the greenhouse world, the electromagnetic spectrum, radiant energy, the four laws of radiation (i.e., Planck's law, Wien's Law, Stefan-Boltzman Law, and Kirchoff's Law) using figures and diagrams.</p> <p>Class meeting 13: Use graphs to learn how atmospheric CO₂ and global temperatures have changed over time. Examine graphs of when a 1.5°C warming will occur and what solutions will be needed and what CO₂ levels will be like in the future.</p> <p>Class meeting 14: show figures to compare what the world will look like under 1.5°C and 2.0°C warmings. Show figures of changes in Arctic sea-ice volume and area, sea level changes.</p> <p>Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and the cumulative final exam. Therefore, students will be tested three times on every concept during the semester.</p>	
<p>Approximately ten lectures/ five weeks will be devoted to evaluating the evidence and arguments about climate change and how it will affect society.</p> <p>Written assignment: carbon footprint - students will calculate their carbon footprint using an online tool and then write up a summary that includes how their carbon footprint will affect climate change and why their carbon footprint was so high. They will collect data and evaluate their data and critically evaluate how their carbon footprint will affect climate change. They will write up a summary evaluating how their footprint compares to what is needed to curb greenhouse gas emissions. This will come from various sources (i.e., IPCC, Nature & Science, etc.). In their summary the students will assess what their footprint</p>	<ul style="list-style-type: none"> • FC 2: Evaluate evidence and arguments critically or analytically.

<p>means for climate change and what things they could change to improve their carbon footprint. See appendices at the end of class syllabus and schedule. Assessment: Students will be graded on their ability to understand evidence about and what their footprints mean for combatting climate change.</p> <p>Examples done in class</p> <p>Class meeting 10: the students will look at graphs and figures showing the evidence for climate change. Evaluate data of greenhouse gases in terms of the effective infrared radiation absorption and how long they last in the atmosphere and their global warming potential. Look at graphs of seasonal, decadal and longer-term records of atmospheric CO₂, methane, nitrous oxide, CFC, and water vapor.</p> <p>Class meeting 11: Students will discuss claims about climate change (medieval warm period was warmer than today, earth's climate is controlled by the sun, etc.), How reliable are the data, separate and different lines of evidence showing human-caused warming.</p> <p>Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and the cumulative final exam.</p>	
<p>The students will have written assignments throughout the semester and will include their calculation of their carbon footprint and ecological footprint.</p> <p>Written assignment: Carbon footprint- students will calculate their carbon footprint using an online tool and then write up a summary that includes how their carbon footprint will affect climate change and why their carbon footprint was so high. They will read articles on what the carbon footprint means from various sources (i.e., IPCC, Nature & Science, etc.). They will produce well-reasoned written arguments on what their carbon footprint means for climate change and what things they could change to improve their carbon footprint. See appendices at the end of class syllabus and schedule. Assessment: Students will be graded on their ability to understand fundamental concepts about climate and what their carbon footprints mean for combatting climate change.</p> <p>Written assignment: Ecological Footprint: students will calculate their ecological footprint using an online tool (http://www.footprintcalculator.org/) and then write up a summary of what this means for using up earth's resources based on articles they will read and what things they could change to improve their ecological footprint. See appendices at the end of class syllabus and schedule.</p> <p>Assessment: Students will be graded on their ability to evaluate</p>	<ul style="list-style-type: none"> • FC 3: Produce well-reasoned written or oral arguments using evidence to support conclusions.

<p>what their footprints mean for safe guarding earth's resources.</p> <p>In addition, the students will read peer-reviewed articles so they can produce well-reasoned written arguments using evidence to support their conclusions.</p>	
<p>A course in this area (II.E) <u>must meet at least three of the additional learning outcomes</u> in the right column. A student will:</p>	
<p>This course will apply concepts related to meteorology and climate change. The first four weeks will be devoted to concepts and methods of meteorology that are especially important to understanding climate change science. The rest of the course will focus on concepts and methods for understanding past, present and future climate change and its impact on society</p> <p>Written assignment: future sea level changes – Students will go to a website that can show them how high sea level will be in their area in the coming decades (https://coastal.climatecentral.org). They will learn and apply fundamental concepts about sea level rise and how it is linked to climate change as well as learn on how it will affect society.</p> <p>Assessment: Students will be graded on their ability to understand fundamental concepts about sea level and what future sea level rise means for society.</p> <p>Written assignment: Carbon footprint – Students will learn about the methods of determining carbon footprints for individuals. They will apply how their carbon footprint will affect climate change. See appendices at the end of class syllabus and schedule. Assessment: Students will be graded on their ability to understand fundamental concepts about climate and what their footprints mean for combatting climate change and safe guarding earth's resources.</p> <p>There are many examples of identifying and applying fundamental concepts. Here are a few examples:</p> <p>In the 3rd lecture, students learn the fundamental concepts about temperature and heat transfer. This includes phase changes, latent heat, conduction and convection, the four basic laws of radiation, as well as the basic understanding of electromagnetic energy and the differences of this energy between the sun and earth.</p> <p>In lecture 5, the students learn about the fundamentals of atmospheric stability, which is shown with figures, videos and photos as well as how each type of precipitation forms using videos during the lecture and figures.</p> <p>In lecture 8, students will learn the fundamentals of climate change that include what is the greenhouse effects, how various gases are greenhouse gases, the natural and manmade sources of climate change. This will include the short- and long-term</p>	<ul style="list-style-type: none"> • SW 1: Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.

<p>mechanisms for climate change such as ENSO, IPO for decadal time scales to Milankovitch cycles that occur at the tens of thousands of year time scales.</p> <p>Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and finally the cumulative final exam. They will be again tested in understanding these skills by taking the hourly exams and finally the cumulative final exam. Therefore, students will be tested three times on every concept during the semester.</p>	
<p>This course will show how instruments of meteorology (e.g., weather data collection instruments, satellites and computer models) are used to understand weather from local areas to globally as well as make predictions about future weather conditions. In addition, students will learn the tools to analyze how the climate is changing (e.g., computer models, instruments to collect data used to collect data) that are used to analyze problems and develop solutions. Also, students will learn about the tools and the data sets scientists use to understand past climate changes.</p> <p>Written assignment: Calculating sea-level rise – The students will learn about the tools of how sea level is calculated and how these tools can predict what future coastlines will be like with the goal of the students being able to analyze the consequences of future sea-level rise will have on our region. The students will write up a summary of how using the tools to predict future sea level rise, they can analyze how using these sea level rise.</p> <p>Assessment: Students will be graded on their ability to understand fundamental concepts about sea level and what future sea level rise will mean for society.</p> <p>In lectures 4 and 5, students will learn the tools and instruments of meteorology that are used to understand and predict weather changes.</p> <p>In lecture 12, students will learn about some of the methods scientists use to understand past climate changes. This will include stable isotopes, tree rings and ice cores.</p> <p>Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and finally the cumulative final exam. Therefore, students will be tested three times on every concept during the semester.</p>	<ul style="list-style-type: none"> • SW 2: Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.

This course will use empirical evidence to support the conclusion that the climate is changing because of humanity.

Written assignment: Calculating your carbon footprint –

Students will calculate their carbon footprint by collecting empirical data an online tool (<https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/>). See appendices at the end of class syllabus and schedule.

They will write up a summary comparing how their footprint compares to what is needed to curb greenhouse gas emissions. This will allow them to create and support a scientific idea on what their carbon footprint means for climate change. Their background understanding will come from the lecture as well as from various sources (i.e., IPCC, Nature & Science, etc.). In their summary the students will evaluate their data and what their footprint means for climate change and what things they could change to improve their carbon footprint. **Assessment:** Students will be graded on their ability to understand and interpret empirical evidence about climate and what their carbon footprints mean for combatting climate change. See appendices at the end of class syllabus and schedule.

Written assignment: Calculating sea-level rise – The students will evaluate evidence about how high sea level rise in the coming decades. The goal is students be able to understand the hypothesis of what sea level rise will do to our coast lines and our cities and neighborhoods. They will write up a summary of how they evaluated the evidence for sea level rise.

Articulate and evaluate the empirical evidence supporting a scientific or formal theory. **Assessment:** Students will be graded on their ability to understand fundamental concepts about sea level and what future sea level rise will mean for society.

Written assignment: Calculating their ecological footprint –

Students will evaluate their ecological footprint by collecting empirical data an online tool (<http://www.footprintcalculator.org/>). They will write a summary that will evaluate how their footprint will affect the environment. This will allow them to create and support scientific ideas on what their ecological footprint means for creating a sustainable future. Their background understanding will come from the lecture as well as from various sources (i.e., journals of Nature & Science, newspaper articles, etc.). In their summary the students will evaluate their data, what their footprint means for the environment, and what things they could change to improve their ecological footprint. See appendices at the end of class syllabus and schedule. **Assessment:** Students will be graded on their ability to understand fundamental concepts on sustainability and resource usage and what it means for society.

Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which

- SW 3: Articulate and evaluate the empirical evidence supporting a scientific or formal theory.

<p>they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and finally the cumulative final exam. Therefore, students will be tested three times on every concept during the semester.</p> <p>Assessment: Students will be graded on their ability to evaluate fundamental concepts about climate and what their footprints mean for safe guarding earth's resources.</p>	
	<ul style="list-style-type: none"> • SW 4: Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.
<p>This course will show scientific principles in underlying matters of policy and public concern starting with lecture 8 and continuing to the end of this course.</p> <p>Written assignment: Calculating your carbon footprint – Students will calculate their carbon footprint by collecting empirical data an online tool (https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/). The data the students generate will be used to understand how their carbon footprint is important to public policy. They will write up a summary comparing how their footprint compares to what is needed to curb greenhouse gas emissions. In particular, the lecture on the reports from the IPCC in lectures 13 and 14 will use scientific principles that relate to policy and public concerns about climate change. See appendices at the end of class syllabus and schedule. Assessment: Students will be graded on their ability to understand fundamental concepts greenhouse gas emissions and what it means for climate change. See appendices at the end of class syllabus and schedule.</p> <p>Written assignment: Ecological Footprint: students will calculate their ecological footprint using an online tool (http://www.footprintcalculator.org/). They will learn about eh scientific principles as overshoot day and how individuals and countries are using more resources than they have. Their understanding will be based on a summary they will write of what this means for using up earth's resources based on articles they will read and what things they could change to improve their ecological footprint. . Assessment: Students will be graded on their ability to understand fundamental concepts sustainability and resource usage and what it means to the future of society. See appendices at the end of class syllabus and schedule.</p> <p>Written assignment: future sea level changes – Students will go to a website that can show them how high sea level will be in their area in the coming decades (https://coastal.climatecentral.org). They will learn and apply fundamental concepts about sea level rise and how it is linked to climate change. Assessment: Students will be graded on their ability to understand fundamental concepts about sea level and what future sea level rise will mean for society.</p>	<ul style="list-style-type: none"> • SW 5: Understand the scientific principles underlying matters of policy or public concern in which science plays a role.

The lectures from 14 through 20 will also will relate scientific data about sea level change, coastal flooding, droughts, water shortages, fresh water flooding, and biodiversity losses to policy and public concern.

Assessment: these learning outcomes will be assessed by the students taking an online quiz at the end of each week in which they will be tested on the material by looking at figures, tables to demonstrate they can examine and interpret data. They will be again tested in understanding these skills by taking the hourly exams and finally the cumulative final exam. Therefore, students will be tested three times on every concept during the semester.