

CHEM 360

Scaling Sustainability: Global Impacts on Environment and Energy Spring 2022 Syllabus

Instructor: Nathanael M. Kidwell
Email: nmkidwell@wm.edu (CHEM 360 in subject line); Office: ISC 1287

Class Meetings: T/R 11:00-12:20pm in ISC 1280; Course information is on Blackboard

Office Hours: T 10:00-10:50am in ISC 1287; or by appt



Course Description and Goals

The seemingly small decisions and actions we make on a daily basis not only impact our immediate surroundings but have long-term consequences that shape global perspectives and large-scale events. Small-scale laboratory findings have the potential to revolutionize societies, and grass-roots movements could possibly enact global change. With the focus on sustainability, this course will explore global and cultural viewpoints on environmental and energy-related issues. In particular, we will develop a molecular-scale understanding of regional atmospheric composition in different locations and their collective influence on global warming. Furthermore, we will study global perspectives on day-to-day energy utilization and discuss if renewable energy resources are a viable and scalable option for different societies. Students will develop critical thinking, analytical writing, and presentation skills by evaluating course-relevant scientific literature and media sources. In a broader context, students will improve their ability to better assess the risks and benefits of socially-relevant issues and to make informed decisions about technology-based matters.

Course Theme: Scale and Sustainability

The notion of scale is intrinsic to how we understand the world and our place in it. The scale of interactions between people varies across space, evolves over time, and profoundly influences how we relate to each other, to cultures, and to our environment. How do changes in the breadth and speed of global communication influence languages and cultures? How do scientists use small-scale laboratory experiments to solve large-scale global problems? How do small grassroots movements evolve into major forces for cultural change around the world? From the local to the global, the microscopic to the macroscopic, and the personal to the collective, Scale informs our experience and our efforts to effect change.

Add/Drop Deadline: 02/04

Withdraw Deadline: 03/28

Course Learning Objectives

After completing this course – as an active partner in learning, communicating, and creating – you will be able to:

- Develop critical thinking, analytical writing, and presentation skills by evaluating course-relevant scientific literature and media sources.
- Improve their ability to better assess the risks and benefits of environmental and energy-relevant issues.
- Make informed decisions about technology-based matters.
- Discuss and assess the scalability of sustainability in the context of different countries, cultures, and societal norms.
- Effectively communicate your knowledge about an environmental or energy issue by examining current problems, creating written evaluations, and delivering compelling narratives using Story Maps.

Required Texts

1) *Environmental Success Stories: Solving Major Ecological Problems and Confronting Climate Change* by Frank M. Dunnivant; Columbia University Press, 2017. ISBN: 0231179197.

2) *The Great Derangement: Climate Change and the Unthinkable* by Amitav Ghosh; University of Chicago Press, 2017. ISBN: 0226526812.

3) *Alternative Energy: Political, Economic, and Social Feasibility (2nd Edition)* by Christopher A. Simon; Rowman & Littlefield Publishers, Inc., 2019. ISBN: 1538116367.

4) *Oil on the Brain: Petroleum's Long, Strange Trip to Your Tank* by Lisa Margonelli; Broadway Books, 2008. ISBN: 0767916972.

COLL 300 Visitors

The COLL 300 visitors include Profs. Ana L. Moore, Richard Zare, Andrew Farnsworth, and Daniel Hernandez-Salazar who will each describe Scale and Sustainability within their disciplines. After the COLL 300 visitor's seminar or their video is posted on BB, students will write a Reflection Paper in response to a prompt that will be posted with the video. Reflection Papers are required for 2 of 4 visitors. Due dates on Blackboard.

Story Map Project

Student teams consisting of 3 students (one team will have 4 students) will develop an interactive Story Map with [ArcGIS Online](#) to tell a story of an environmental or energy-related topic in another country. Each student within the team will drill deeper into some aspect (economics, policy, science, history, sociology, etc.) that you find particularly interesting or important, and this aspect will also form the basis of each student's Term Paper. **We will have in-class Story Map workshops scheduled on Feb. 10 and Mar. 10 with a representative from the campus Center for Geospatial Analysis to learn best practices when developing Story Maps.** More information will be given about the Story Map projects during the semester.

Student Course Responsibilities and Course Policies

Attendance: A good class discussion depends on the participation of all students; therefore your engagement in class is expected. Full participation includes coming to class prepared, asking and answering questions, sharing in discussion, collaborating and communicating effectively with your peers. Two unexcused absences will lower your **final** grade by one-third letter grade (e.g. A- to B+). Excused absences include those arranged with me beforehand. You should have completed all assigned reading before class.

Class Behavior: Please remain civil during discussions to promote the open exchange of ideas and foster a culture of open dialogue. Please bear in mind that all students are entitled to their own opinion. You are expected to listen attentively to each person speaking.

Breaking News: New information relevant to this course appears every day. Relatively reliable sources for this information include:

- National newspapers (e.g., *The New York Times*, *The Washington Post*, etc.)
- National news magazines (e.g., *Time*, *Newsweek*, *U.S. News and World Report*)
- Scientific news magazines (e.g., *Science News*, *Scientific American*, *Discovery*)

The first part of each class session will be spent discussing news items *relevant to the class*. Contributions of breaking news items will be used as a partial basis for the class contribution grade. Teams will be the assigned “News Anchors” at each class meeting. These students will provide an overview of the most significant or interesting class-related news stories since our last class and coordinate discussion.

Preparation for class discussions: Unlike most chemistry classes, this will be a class based on informal discussion of the reading assignments. For this reason, it is essential that students come prepared to discuss the reading. Students will be expected to post on Blackboard a PDF list of points and questions (discussion points) from the reading assignments to be used during class. These discussion points will also be used as a partial basis for the class participation grade.

Team Presentation: Each student team will be responsible for presenting a 15-20 minute PowerPoint presentation on the team’s project to the rest of the class. A coherent story should be told on an environmental or energy-related topic in another country, where each student describes a particular aspect they chose (economics, policy, science, history, sociology, etc.). **We will have a Swem Library workshop on Feb. 3 to refresh skills on researching topics, databases, etc., and to fine tune the specific ideas for each team.**

The presenting student team will be responsible for giving a general overview of the significance of the environmental or energy-related topic chosen; for discussing background material and answering questions; and for directing

class discussion. All other students must be prepared to ask questions at the end of the presentation, which will count toward the class participation grade.

Story Map Presentation: Student teams will give a 20-30 minute presentation, showcasing the Story Map they constructed on an environmental or energy-related topic in another country. Effective communication, creativity, and a compelling story will be rewarded. More information concerning formats and grading rubrics will be provided as the time approaches. Each team's final presentation grades will be an equal combination of grades assigned by your team peers, that assess your individual contributions to the team's effort, and grades assigned by the instructor on the overall quality of the presentation.

Writing Assignments: Writing assignments will be distributed as follows:

Reflection Papers: These assignments are two pages (max) in length. Students will write a responsive paper to a prompt that will be posted on Blackboard along with the COLL 300 visitor's video. They will be graded for content and style on a high pass/pass/low pass/fail basis. Reflection Papers are due on the dates shown on Blackboard, and they are required only for two of the three visitors. You may submit three papers, and I will use the top two grades.

Term Paper: This assignment is eight to ten pages (max., not including references). Every student within each team will write a final Term Paper based on the particular aspect they chose as their focus for the Story Map project. Topics must be approved in advance by the instructor. A schedule for Term Paper research and development is given below. Suggestions to guide your choice of a topic can be found at the end of this syllabus.

Peer feedback: Each student must have one other student from another team read and comment upon a draft of their Term Paper; each student must read and provide one page (250 words) of comments for one other student's Term Paper draft in return. Feedback should take the form of a letter to the author addressing the *content* of the paper. Your comments may argue with the writer, add to what they are saying, point out weaknesses in the argument, etc. Written copies of the feedback will count towards the class contribution grade. Additional comments of an editorial nature (need transition, spell check, sentence fragment, etc.) should be noted on the manuscript. This peer feedback will count toward the class participation grade.

Manuscript Preparation: All papers should be written individually, computer-generated, double-spaced, with left justified one-inch margins (**NOTE:** The default in Microsoft Word is 1.25" unless you change it!) and using 12-point Times New Roman font. Citations for the Term Paper should be in APA format, and should also be provided as a bibliography at the end of your document (this portion of the paper will not count towards the page limit). Direct quotes from sources should not be used. Extensive paraphrasing of sources and failure to cite sources are unacceptable and possible causes for Honor Council deliberation of plagiarism. Papers which do not

fulfill the stated requirements of the assignment will not receive a grade higher than a C. Papers should always be submitted with the **pages numbered**. Proofread carefully before submitting your work! Place your name, the date, and the title of the paper at the top of the first page.

Manuscript/Assignment Submission Procedures:

- The Reflection Papers and the Term Paper should be submitted as a PDF document on Blackboard.
- The discussion points for each day's reading and the peer feedback for Term Papers should also be submitted on Blackboard.

Grading Policies

Grading: Your grade will be calculated as follows:

- Story Map/Term Paper (and associated assignments): 60%
 - Feb. 8: Last day to submit ideas for the Story Map project and Term Papers
 - Mar. 29: One paragraph abstract, outline & preliminary bibliography (at least 5 sources) for Term Paper – 5%
 - Team/Story Map Presentations given on assigned date – 15%
 - Apr. 28: Polished Term Paper draft to be given to peer reviewer – 5%
 - May 5: Peer feedback on Term Paper drafts due – 5%
 - May 10: Final version of the Term Paper due by 11:59 pm and uploaded to Blackboard. A link to your team's Story Map should be included with your Term Paper. – 30%
- Class contributions: 20%
- Reflection Papers from COLL 300 visitors (2 @ 10% each): 20%

There is no final exam, but a final Term Paper and the Story Map are due by the final exam date.

Deadlines: Assignments must be turned in on time. The following policies apply:

1) Daily lists of discussion points will be turned in at the *beginning of the class period on Blackboard*. Unexcused assignments will receive no credit. Assignments must be completed **before** you come to class.

2) All other assignments are due on the designated day as PDF or Word files on Blackboard by 11:59 pm. These assignments are subject to the following rule: for every day they are late, they will be worth 25% less. Note that weekend days and non-class days do count.

3) I am prepared to be flexible with these policies to a reasonable degree if you are significantly impacted by COVID-19. Extenuating circumstances must be communicated to me in a timely manner. See page 8 of the syllabus for policies addressing temporary absences.

Class Climate, Culture and the Honor System

This is a COLL 300 course, designed to give students a chance to explore an academic area of interest through the lens of a global perspective. Most class periods will be filled by discussion of the assigned reading, with frequent opportunities to write and showcase their work. In order for discussions to be productive, all students need to feel comfortable participating. We will create and maintain an atmosphere of mutual respect in which everyone's ideas can be heard.

Scientists always seek feedback from their colleagues when preparing papers and oral presentations. I encourage students to collaborate in this way as well. Note that feedback includes comments and critiques; it does NOT include doing the work for someone else.

Since William & Mary has an Honor System, I feel comfortable encouraging collaboration between students. Please see me if you have any questions about how the Honor System applies to your responsibilities in this course.

Classroom Technology Policy

Every one of you contributes to the learning environment of this class through your presence, your questions and discussion points, and the energy you bring to the meeting. Technology can enhance the learning environment when you use it to seek additional information or document an activity. However, technology can also distract you and those around you to the point that it destroys our carefully crafted learning environment. Accordingly, the use of laptops, tablets, and phones for texting, social media, email, and web browsing unrelated to class is prohibited. Inappropriate use of technology will result in a substantial reduction in your participation and/or final grade.

Student Accessibility Services

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see ww.wm.edu/sas.

Relevant Resources to this Course

I strongly encourage you to use these resources. Every professional needs to be able to write and to speak in public. Practice over time with good feedback is the best way to develop these skills.

A. The Writing Resources Center:

Located on the main floor of Swem Library, the Writing Resources Center serves students, faculty, and staff. Writing consultants (students trained by the

Writing Resources Center staff) will give individual assistance with writing assignments at any stage of the writing process. Expect to work: they will not do the writing for you, but they can give you feedback that will improve your writing skills and result in a better final product. Consultations are free but must be scheduled in advance.

B. The Purdue Online Writing Lab – OWL (<https://owl.english.purdue.edu/>):
This site provides some exercises and general rules for word use, spelling of similar sounding words, etc.

C. Oral Communication Studios:

The Oral Communications Studios, located with Writing Resources, are staffed by oral communications consultants (students trained by the staff of the Oral Communications Studio) who can critique and advise students who are preparing oral presentations.

D. Center for Geospatial Analysis:

The Center for Geospatial Analysis is located on the second floor of Swem Library, and is staffed with professionals who may be used as a resource for your team as you are developing the Story Map project.

Choosing a Topic for your Story Map and Term Paper

Choosing an appropriate topic takes time. Plan to:

1) Spend time brainstorming; use news sources and your textbooks to come up with a short list of topics that interest you. A Google search can help you find a wide selection of information sources, some of which will be reliable: use the results with care! Brainstorm with your teammates and use the Swem Library workshop to your advantage.

2) Discuss possible topics with the instructor, either by e-mail, during an appointment, or before/after class.

3) Do preliminary literature searches using the databases available through the Swem home page to see if the topics you have found can be covered effectively in your Story Map presentation and Term Paper. To search the scientific literature for information on your possible topic, be sure to use the Summon Discovery search engine in Swem's web research pages.

***Talk to the reference librarians in Swem, if you need help finding information on your topic.

A good Story Map and Term Paper topic will have the following characteristics:

- 1) The topic should be current: Be sure that most of your citations were published in the last five years; papers from 2017 – 2022 should **dominate** your reference list for maximum credit!
- 2) The topic should be focused: be sure that you can discuss details rather than generalizations.
- 3) The topic should be understandable. Be sure that the references you find when you do your initial search for key sources are reasonably easy for you to understand.
- 4) The topic should be interesting to you. By the end of the semester, you will have spent a great deal of time with your topic. If it started out seeming boring but appropriate, you will hate it by the end of the semester.

Course Plans to Address COVID-19 Temporary Absences

If you must be absent from class, your instructor will work with you to develop a plan to participate in the discussion (e.g., participate in the discussion remotely using Zoom, etc.). Significant extenuating circumstances that would lead to multiple absences from class and require further policy exceptions should also be communicated to the Dean of Students. If a sufficiently high proportion of the class is unable to attend in person, we will meet remotely via Zoom.

If the instructor is unable to teach in-person, one of two possibilities will occur, depending on the circumstances: 1) we will meet on Zoom, or 2) another faculty member will teach that day. Any changes will be communicated to the class as soon as possible.

Course Calendar (tentative)

Date	Readings	Assignments	News Anchors
Jan. 27	Course introduction Review of syllabus, policies, etc.		
Feb. 1	Ghosh 1.1-1.4	In-class: Form teams and brainstorm preliminary team project ideas	
Feb. 3	Swem Library Workshop (Meet in Cox Classroom in Swem Library)		
Feb. 8	Dunnivant Ch. 1; Ghosh Ch. 1.5-1.8	Team project idea due During class: Make story boards	
Feb. 10	Story Map Workshop I		
Feb. 15	Dunnivant Ch. 2; Ghosh Ch. 1.9-1.12		Team #2
Feb. 17	Dunnivant Ch. 3; Ghosh Ch. 1.13-1.18		Team #3
Feb. 22	Dunnivant Ch. 4; Ghosh Ch. 2.1-2.5	Team Presentation #1	Team #4
Feb. 24	Dunnivant Ch. 5; Ghosh Ch. 2.6-2.9	Team Presentation #2	Team #5
Mar. 1	Dunnivant Ch. 6	Hernandez-Salazar Reflection Paper Team Presentation #3	Team #6
Mar. 3	Dunnivant Ch. 7; Ghosh Ch. 3.1-3.5	Team Presentation #4	Team #7
Mar. 8	Dunnivant Ch. 8-10; Ghosh Ch. 3.6-3.9	Team Presentation #5	Team #1
Mar. 10	Story Map Workshop II		
Mar. 15	Spring Break		
Mar. 17	Spring Break		

Date	Readings	Assignments	News Anchors
Mar. 22		Story Map Project	
Mar. 24		Greta Thunberg: A Year to Change the World (PBS Docuseries)	
Mar. 29	Simon Ch. 1; Margonelli Ch. 1	Team Presentation #6 Outline, Abstract, & Preliminary Bibliography (at least 5 sources) for Term Paper	Team #2
Mar. 31	Simon Ch. 2; Margonelli Ch. 2	Team Presentation #7 Attend Prof. Zare's Public Seminar on Sustainability	Team #3
Apr. 5	Simon Ch. 3; Margonelli Ch. 3	Moore or Zare Reflection Paper	Team #4
Apr. 7	Simon Ch. 4; Margonelli Ch. 4		Team #5
Apr. 12	Simon Ch. 5; Margonelli Ch. 5	Story Map Presentation #1	Team #6
Apr. 14	Simon Ch. 6; Margonelli Ch. 6	Story Map Presentation #2	Team #7
Apr. 19	Simon Ch. 7; Margonelli Ch. 7	Story Map Presentation #3	Team #1
Apr. 21	Simon Ch. 8; Margonelli Ch. 8	Story Map Presentation #4	
Apr. 26	Simon Ch. 9; Margonelli Ch. 9	Story Map Presentation #5	
Apr. 28	Margonelli Ch. 10	Story Map Presentation #6 Polished draft of Term Paper due today	
May 3	Margonelli Ch. 11	Story Map Presentation #7 Zare or Farnsworth Reflection Paper	
May 5	Reflections on the Course	Peer feedback on Term Paper due	
Final Exam Period Begins			
May 10		Final version of Story Map and Term Paper due by 11:59 pm as a PDF file uploaded to BB with Story Map link.	