SYLLABUS: CLIMATE CHANGE SCIENCE AND SOLUTIONS
UF Quest 2 Spring 2020 IDS 2935/Sec 2PZ1/#23208

Tuesday 6th period (12:50-1:40 pm; FLI 119) &
Thursday 6th-7th period (12:50-2:45 pm; FLI 117)

INSTRUCTORS

Lead Instructor: Dr Andrew Zimmerman, Department of Geological Sciences
Office: 364 Williamson Hall, Ph# 392-0070, e-mail: azimmer@ufl.edu, Office Hours: Monday 2-3 pm (or by appt.)

Graduate Teaching Assistant: Ling Lyu, e-mail: jinglyu@ufl.edu

COURSE DESCRIPTION

Global climate change is the defining issue of our time. It will impact every aspect of life, from the economy, to agriculture, health and ecology, in the 21st century and beyond, and in every country of the Earth. And yet, because of its complexity, multidisciplinary nature, and the preconceptions held by individuals, most people only have a dim understanding of the evidence for, predicted effects, and potential solutions to this issue. In addition to presenting students with the scientific background necessary to evaluate the evidence for the theory of anthropogenic climate change and the global effects of climate change, we will use the topic of climate change to examine how modern science 'is done' and how it is viewed and used in society, globally. Working collaboratively and using the scientific method, we will explore the multi-disciplinary evidence behind climate change and its global and cross-cultural effects and develop potential novel adaptation and mitigation solutions and to communicate this work effectively.

Prerequisites: none **Credits:** 3 **Course Fee:** none

This Class in the Quest 2 Curriculum and fills Physical Science (P) and International (N) Gen Ed Requirements

COURSE DELIVERY

The course will require both on-line and in-class participation. Each week, students will:

1) Complete a 'Spark' Discussion on topic of the week (the day before Tuesday class)
2) Attend 1 class period that will focus on direct content delivery, i.e. mainly lecture by instructor (Tuesday)
3) Do assigned readings (in textbook and provided on-line) and take on-line quiz (night before Thursday class)
4) Attend 2-period class (Thursday) in which students will:
   - Review material and quiz with the instructor
   - Complete an In-Class Activity that reinforces the 'Fundamental Science Topic' & 'Framework Topic'. This is usually a group activity that will be turned in (via Canvas, one per group, by Friday night). These weekly activities/discussions will build on lecture content by introducing qualitative and quantitative data analysis and experiential learning through real-life problem assessment. Group activities challenge students to synthesize this information and create novel solutions for personal, national, and international dilemmas.

In addition, students will work on a semester-long group project, both in and outside of class, which will, via hypothesis testing and quantitative analysis, develop a novel approach to mitigating climate change.

Students are required to bring a laptop or other web-enabled device (though use of a smart phone is not advised). Students are also required to participate in a midterm exam one evening of the semester and the final exam.

COURSE MATERIALS

Course Website

The course will run via **Canvas** (UF https://ufl.instructure.com/). The course site will be used to post relevant announcements, reading, lecture materials, links, assignments and quizzes, etc. You are responsible for checking this site for updates, announcements and to verify that your grades are recorded correctly. No grade will be changed more than one week following the due date for the assignment. It is recommended that students adjust Canvas settings so that Announcements are sent to phone or email. All communication with instructors should use the mail tool within this site.

Required Textbook

Dire Predictions: Understanding Global Warming, by Mann and Kump, 2015, Pearson, 2nd edition ($10-20 used on Amazon, Kindle or at the UF bookstore for about $39). In addition, there will be numerous selected readings posted or linked through the course website weekly.

ASSESSMENTS AND GRADING

Final Grade Calculation

18%	Homework (individual):	
	3.6% 12 'Spark' On-line Discussions	3 pts each, 36 total
	14.4% 13 On-line Quizzes (lowest 1 dropped)	12 pts each, 144 total
2.4%	In-class Attendance (individual) 13 meetings (1 dropped)	2 pts each 24 pts. total
36%	In-class Activities (group) 13 assignments, (lowest 1 dropped)	30 pts each, 360 total
30%	Final Project (group)	300 pts. total
	Initial Proposal (group assessment)	1% = 10 pts.
	Hypothesis/Sources (group assessment)	1% = 10 pts.
	Quant. Method (group assessment)	5% = 50 pts.
	Final Presentation (group assessment)	20% = 200 pts.
	Effort and Reflection (individual assessment)	3% = 30 pts.
6.8%	Mid-term Exam* (Curved to a median of 85%, Final Exam)	68 pts.
6.8%	Final Exam* (Curved to a median of 85%, Final Exam)	68 pts.
		1000 pts. Total

Final Grade Scale

A = ≥93%, A- = 90-92.99, B+ = 87-89.99, B = 83-86.99, B- = 80-82.99, C+ = 77-79.99, C = 73-76.99, C- = 70-72.99, D+ = 67-69.99, D = 63-66.99, D- = 60-62.99, E < 60

***Note:** The midterm and final exam scores will be curved to a median of 85% using a linear method described here: http://www.ats.amherst.edu/software/excel/excel-grading/excel-grades/#CurvingGrades

***Note:** A grade of 'C-' or below does not qualify for major, minor, Gen. Ed., or college basic distribution credit. Information on UF grading policies may be found at: catalog.ufl.edu/UGRD/academic-regulations/grades-gradingpolicies/.

Discussions

Discussion are meant to initiate thinking on the week's topic before any material has been presented. For each 'Spark Discussion', each student must make one substantive original comment (1.5 pts.) and one substantive response to the comment of another student (1.5 pts.). That is, students must read what has been said before and add something more than a few words of agreement or disagreement. No credit will be given for late submissions.

Quizzes and Exams
Each week students must complete a time-limited (30 min.) quiz on Canvas by midnight of the day before the 2-period class consisting of 12 multiple choice questions (open book/notes) on all lecture and reading materials presented that week. These quizzes cannot be made up or taken late if missed except in the case of an excused absence. (At 11:59 pm, the quiz will lock students out and unanswered questions will be marked wrong. So start by 11:30 p.m.)

The Midterm Exam will be given on campus in the evening of the 7th class week (7:20-9:10 pm, see schedule below), closed book. Students must bring a laptop to take the exam which will consist of about 50 multiple choice questions (some taken from quizzes, some new). Everything associated with the class up to the point of the exam (Weeks 1-6), including on-line material and in-class discussion/exercises, is fair game on the mid-term exam. If there is an issue with attending the exam at this time, it should be discussed with the instructor at least one week prior to the date. The final exam will be during the scheduled time and cover all material of the course.

In-Class Activities
At each class meeting, there will be a team assignment (answer to questions, spreadsheet calculation, etc.) to be completed and turned in, usually via Canvas (Assignment Tab) by the evening of the day after class (11:59 pm). Group members should indicate and rotate assignment of lead submitter. Exceptions may be granted by special arrangement with the TA. These assignments will not be accepted after 1 week following the class. Full credit will be awarded as follows:

- 3 points – Assignment was submitted by the due date (1 point loss if submitted within 1 day of due date)
- 9 points – Demonstrates complete competence in the terminology, concepts, methodologies and theories used within the subject area.
- 9 points – Critical Thinking: Carefully, logically, and fully analyzes information from multiple perspectives and develops reasoned solutions to problems within the subject area.
- 9 points – Communication: Clearly and effectively communicates knowledge, ideas, and reasoning in forms appropriate to the subject area.

Attendance
Attendance scoring will be managed by the Canvas system. Check to make sure all values are recorded correctly. Let your TA know about any excused absence/lateness and the Canvas score can be corrected. No corrections will be made more than 1 week after the absence/lateness event.

Semester Project
Students, in groups of 3-4, will be asked to work as a team to create and evaluate either a strategy to mitigate climate change. The strategies will range widely, e.g., from a solar-powered bicycle to a change in international law. We encourage student groups to consider a local or regional problem and solution, but it is important that the project also be evaluated from an international and multicultural perspective as well. Each group will also quantitatively evaluate the cost and/or potential impacts that would result from the adoption of their strategy. During the course of the semester, both lectures and sub-assignments will build students' skills and the knowledge base needed for this kind of problem solving. At the end, an oral presentation will be made to the class. More details can be found on the course website.

Extra Credit/Field Trip
We will visit the Solar Park just south of campus (Solar Decathlon House, Solar array, Bioenergy Lab) during the semester (see schedule below). Those attending the field trip will receive 2% extra credit added to final grade tally. HOWEVER, if you commit to going but do not show up, I will deduct 0.5% from your final grade. Transportation will be provided.

COURSE AND UNIVERSITY POLICIES

Absence/Late Assignments
Students are expected to complete all requirements (quizzes, exams, presentation) on the specified dates and will not be granted an alternate date unless they have an acceptable reason for their absence (e.g., due to medical emergency, observance of religious holidays, military obligation, etc.) and pre-arranged consent of the instructor. These requests must be timely and accompanied by all necessary written documentation. This policy is accordance with UF's attendance policies, which can be reviewed further at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx. Quizzes and assignments completed late will suffer a loss of points spelled out in each section above (generally half off). No assignment can be turned in more than 1 week after its due date without instructor consent. Discussions cannot be completed late.

Grade Appeals
Students or student groups who feel that their quiz, discussion, in-class activity or semester project was graded unfairly or incorrectly should make an appointment with their TA to discuss the issue. If students are still dissatisfied with the resulting explanation or action, they should then make an appointment with the lead instructor to discuss the issue.

Classroom policy and demeanor
Students are required to bring to each class meeting a laptop or similar device for use in taking notes, summarizing in-class activities, and accessing the Internet. However, use of mobile devices and computers during class for purposes other than viewing readings or conducting sanctioned research/communications is not allowed. Students who receive or make calls or text messages or engage in other disruptive behavior during class will be asked to leave will not be allowed to turn in the assignment due on that day.

Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

Academic Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Materials and Supplies Fees: There are no additional fees for this course.

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Such violations are also against University policies so disciplinary action may be taken.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Health and Wellness
U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit shcc.ufl.edu/.

University Police Department: Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road,
Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/.

Drop/Add/Withdrawal
A student can drop/add during the drop add period with no penalty. After drop/add, a student who drops will receive a W until the date listed in the academic calendar. After that date, the student may be assigned an "E" (fail). Note: it is the responsibility of the STUDENT to withdraw from a course, not the instructor. Failure to participate/complete the class is NOT a drop.

Weekly CCSS Due Dates*

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	On-line 'Spark Discussion' due 11:59 pm	**Class Lecture** (12:50-1:40)	Complete Readings **On-line Quiz due 11:59 pm**	**Class** (12:50-2:45)	**Turn in ICA on-line by 11:59 pm**	

*this does not include due dates of assignments relating to the Semester Project, Midterm Exam or Field Trip

Spring 2020 COURSE SCHEDULE

Week Of:	Week #	Module	Fundamental Science Topic	Framework Topic	Other Activities	Reading in 2nd Ed. *Dire Predictions* pgs.
6 - Jan	1	Introduction to climate and CC	Perceptions of CC	Interdisc. Science		
13 - Jan	2		Climate Drivers	Scientific Method		6-29
20 - Jan	3		Climate History	How Science is Done		30-51
27 - Jan	4		Evidence for Anthro. CC	Uncertainty/Consensus		30-51
3 - Feb	5		CC and the Weather	Research and Big Data	Intro. Semester Project (2nd hr)	52-67 & 112-115 & 132-135
10 - Feb	6		CC Projections	Models	Sem. Proj. Initial Proposals	68-117
17 - Feb	7	Problems and Solutions	Ecological Impacts of CC	Team Science	Midterm Exam – Feb. 17 (Mon. 7:20 pm)	124-131 & 188-189
24 - Feb	8		Agriculture/ Land Use	Communicating Science	Sem. Project Hypoth./Source	150-163 & 184-187
2 - Mar	x		---------- ---------- No Class – Spring Break ----------			
9 - Mar	9		Population/Consumption	Ethics /Sustainability		136-149 & 206-207
16 - Mar	10		Energy	From Lab to the Real	Field trip – Mar. 17?	164-177
23 - Mar	11		Built Environment	Effecting Change	Sem Proj. Quant. Method Presentation	178-199
30 - Mar	12	CC Policy	Environmental Policy	Science in Action		200-213
6 - April	13		Sea Level Rise	Science in the Public Realm		36-37 & 110-111 & 122-123 & 158-159
13 - April	14		---------- Semester Project Presentations During Class ----------			
20 - April	15		Wrap up/Evaluations/ Individual Assessment		FINAL EXAM Monday April 27, 8:00 – 0:30 AM	

GRADING RUBRICS

For each activity, students are provided with specific instructions for completing the activity and a grading rubric, all within Canvas. The grading rubrics are designed to evaluate the student's mastery of specific content and their ability to produce bodies of work within the guidelines specified in the instructions.

Rubric for Grading of Weekly In-class Activity

Criteria	Rating/Points			
Submission	3.0 pts In-class activity was submitted by the due date.		2.0 pts In-class activity was submitted within 1 day of the due date.	0.0 pts ICA was submitted between 1 and 7 days after the due date.
Content	9.0 pts Demonstrates complete competence in the terminology, concepts, methodologies and theories used within the subject area and fully describes its cross-disciplinary and cross-cultural dimensions.	6.0 pts Demonstrates some competence in the terminology, concepts, methodologies and theories used within the subject area and somewhat describes its cross-disciplinary and cross-cultural dimensions.	3.0 pts Demonstrates poor competence in the terminology, concepts, methodologies and theories used within the subject area and poorly describes its cross-disciplinary and cross-cultural dimensions.	0.0 pts No demonstration of competence in the terminology, concepts, methodologies and theories used within the subject area and does not describes its cross-disciplinary and cross-cultural dimensions.
Critical Thinking	9.0 pts Carefully, logically, and fully analyzes information from multiple perspectives and develops reasoned solutions to problems within the subject area and beyond. Effectively uses data to inform CC approach or policy.	6.0 pts To some extent, analyzes information from multiple perspectives and develops reasoned solutions to problems within the subject area and beyond. Uses data to inform CC approach or policy to some extent.	3.0 pts Mostly description or summary, without consideration or support of evidence. Generally unfocused and no connections made between ideas and beyond subject area. Little use of data to inform CC approach or policy.	0.0 pts Displays no evidence of engagement with the topic.
Communication	9.0 pts Clearly and effectively communicates knowledge, ideas, and reasoning in forms appropriate to the subject area.	6.0 pts Somewhat clearly and effectively communicates knowledge, ideas, and reasoning in forms appropriate to the subject area.	3.0 pts Poorly communicates knowledge, ideas, and reasoning in forms appropriate to the subject area.	0.0 pts The assignment is unfocused and/or displays little or no degree of completion.
				Total = 30 Points

Rubric for Grading of Semester Project Final PRESENTATION

ELEMENT COMPLETION (50 points total)

___/3 pt Title Slide (one slide): title and lists group members,
___/3 pt Introduction (one slide) – presents problem
___/3 pt Detailed proposal outline (one slide)
___/3 pt Well-worded hypothesis and subhypotheses as to the efficacy of the project (one slide)
___/3 pt A method for quantitatively assessing the effectiveness/impact of each hypothesis presented
___/3 pt Equations presented are clear and use an equation editor and all numbers have units
___/3 pt All benefits factored into equations (e.g. if C emissions were reduced, this was monetized)
___/3 pt All data used to solve equations clearly explained and sources given
___/3 pt Citations were made on each slide where facts were used
___/3 pt Quantitative error analysis conducted correctly (not just qualitative list of uncertainties)
___/3 pt Conclusions drawn linked directly to quantitative analysis (hypothesis testing) done
___/3 pt Separate section discussing larger significance provided (importance beyond the scope of the project)
___/3 pt Consideration of project in context of other cultures was made
___/3 pt Bibliography (one slide) including alphabetic listing of all references cited (and no more).
___/3 pt Includes figures on almost every slide to make visually appealing
___/3 pt Text not too small, slides not packed with text
___/2 pt Presentation of material shared equally by group members

Criteria/Score	Outstanding:	Satisfactory:	Unsatisfactory:
CONTENT (P) **__ /30 pts**	Complete competence in applying the terminology, concepts, methodologies and theories used within the subject area (24-20 pts).	Some competence in applying the terminology, concepts, methodologies and theories used within the subject area (20-16 pts).	Poor competence in applying the terminology, concepts, methodologies and theories used within the subject area (<16 pts).
CONTENT (Q & N) **__ /30 pts**	Completely describes the cross-disciplinary and cross-cultural (economic, political/social) dimensions of the project (24-20 pts).	Somewhat describes the cross-disciplinary and cross-cultural (economic, political/social) dimensions of the project (20-16 pts).	Little or no description of the cross-disciplinary and cross-cultural (economic, political/social) dimensions of the project (<16 pts).
CRITICAL THINKING (P) **__ /30 pts**	Very effectively applies logical reasoning skills through scientific criticism and argument within the subject area. Very effectively applies techniques of discovery and critical thinking to solve experiments and to evaluate outcomes (24-20 pts).	Somewhat effectively applies logical reasoning skills through scientific criticism and argument within the subject area. Somewhat effectively applies techniques of critical thinking to solve experiments and to evaluate outcomes (20-16 pts).	Poorly applies logical reasoning skills through scientific criticism and argument within the subject area. Poorly applies techniques of discovery and critical thinking to solve experiments and to evaluate outcomes (<16 pts).
CRITICAL THINKING (Q & N) **__ /30 pts**	Thorough consideration of issues from multiple perspectives (cross-disciplinary and cross-cultural), logically analyzes evidence from credible, relevant sources, and develops fully reasoned conclusions and policy responses (24-20 pts).	Considers issues from multiple perspectives (cross-disciplinary and cross-cultural), logically analyzes evidence from credible, relevant sources, and develops reasoned conclusions and policy responses (20-16 pts).	Does not consider issues from multiple perspectives (cross-disciplinary and cross-cultural), or logically analyze evidence from credible, relevant sources, and develop reasoned conclusions or policy responses (<16 pts).
COMMUNICATION **__ /30 pts**	Communicates knowledge, ideas, and reasoning clearly and effectively, very polished and practiced (24-20 pts).	Communicates knowledge, ideas, and reasoning, somewhat polished, with some polish & practice (20-16 pts).	Does not communicate ideas and reasoning effectively, not polished or practiced (<16 pts).
Total: ____ /200 Points			