Cover Sheet: Request 15297

GLY 2XXX – Climate Change Science and Solutions

Info

Process	Course|New/Close/Modify|Ugrad|Gen Ed|Quest|Perm
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Andrew Zimmerman azimmer@ufl.edu
Created	9/30/2020 2:46:43 PM
Updated	2/26/2021 10:25:44 AM
Description of request	New Course, Quest 2, P and N

Actions

Step	Status	Group	User	Comment	Updated
Quest Director	Approved	PV - Quest Director	Andrew Wolpert		10/15/2020
GLY2xxx_Q2 Perm_cover lett.pdf					9/30/2020
Department	Approved	CLAS - Geological Sciences 16240000	David Foster		10/30/2020
No document changes					
College	Recycled	CLAS - College of Liberal Arts and Sciences	Joseph Spillane	The College Curriculum Committee recycles this proposal, with the following needed: • Course Objectives need to be objectives, not what will happen in the course. • Transcript title suggestion: Climate Change Sci Solutions • In-class activities explain in proposal (same way as in syllabus). • Adds up to 103% for grade, please correct	1/26/2021
No document changes					
Department	Approved	CLAS - Geological Sciences 16240000	David Foster		1/26/2021
No document changes					
College	Approved	CLAS - College of Liberal Arts and Sciences	Joseph Spillane		2/6/2021
No document changes					
Quest Curriculum Committee	Approved	PV - Quest Curriculum Committee	Andrew Wolpert		2/25/2021
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			2/25/2021
No document changes					

Step	Status	Group	User	Comment	Updated
General Education Committee					
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					
Quest Director Notified					
No document changes					

Course|Gen_Ed|New-Close-Modify|Quest-Perm for request 15297

Info

Request: GLY 2XXX – Climate Change Science and Solutions
Description of request: New Course, Quest 2, P and N
Submitter: Andrew Zimmerman azimmer@ufl.edu
Created: 2/2/2021 3:13:47 PM
Form version: 7

Responses

Recommended Prefix
Enter the three letter code indicating placement of course within the discipline (e.g., POS, ATR, ENC). Note that for new course proposals, the State Common Numbering System (SCNS) may assign a different prefix.

Response:
GLY

Course Level
Select the one digit code preceding the course number that indicates the course level at which the course is taught (e.g., 1=freshman, 2=sophomore, etc.). Quest 1 courses may only select 1 & Quest 2 courses may only select 2.

Response:
2

Course Number
Enter the three digit code indicating the specific content of the course based on the SCNS taxonomy and course equivalency profiles. For new course requests, this may be XXX until SCNS assigns an appropriate number.

Response:
xxx

Category of Instruction
Indicate whether the course is introductory, intermediate or advanced. Introductory courses are those that require no prerequisites and are general in nature. Quest courses may only select Introductory at this time.

Response:
Introductory

Lab Code
Enter the lab code to indicate whether the course is lecture only (None), lab only (L), or a combined lecture and lab (C).

Response:
None

Course Title

*Enter the title of the course as it should appear in the Academic Catalog. There is a 100 character limit for course titles. *

Response:
Climate Change Science and Solutions

Transcript Title
Enter the title that will appear in the transcript and the schedule of courses. Note that this must be limited to 30 characters (including spaces and punctuation).

Response:
Climate Change Sci Solutions

Degree Type
Select the type of degree program for which this course is intended. Quest courses may only select Baccalaureate.

Response:
Baccalaureate

Delivery Method(s)
Indicate all platforms through which the course is currently planned to be delivered.

Response:
On-Campus

Effective Term
Select the requested term that the course will first be offered. Selecting "Earliest" will allow the course to be active in the earliest term after SCNS approval. If a specific term and year are selected, this should reflect the department's best projection. Courses cannot be implemented retroactively, and therefore the actual effective term cannot be prior to SCNS approval, which must be obtained prior to the first day of classes for the effective term. SCNS approval typically requires 2 to 6 weeks after approval of the course at UF.

Response:
Earliest Available

Effective Year
Select the requested year that the course will first be offered. See preceding item for further information.

Response:
2021

Rotating Topic
Quest courses may not be rotating topics at this time. Please select "No" to confirm this course will not be a rotating topics course.

Response:
No

Repeatable Credit
At this time Quest courses are not being offered as repeatable credit. Please select "No" to confirm this is not a repeatable credit course.

Response:
No

Amount of Credit
Quest courses may only be offered for 3 credit hours at this time, please confirm that this course is a 3 credit hour course.

Response:
3 credits

S/U Only?
UF Quest/General Education courses may not be offered as S/U. Please select no for S/U.

Response:
No

Contact Type
Select the best option to describe course contact type. This selection determines whether base hours or headcount hours will be used to determine the total contact hours per credit hour. Note that the headcount hour options are for courses that involve contact between the student and the professor on an individual basis.

Response:
Regularly Scheduled

• *Regularly Scheduled [base hr]*

Contact the Office of Institutional Planning and Research (352-392-0456) with questions regarding contact type.

Weekly Contact Hours
Indicate the number of hours instructors will have contact with students each week on average throughout the duration of the course.

Response:
3

Course Description
Provide a brief narrative description of the course content. This description will be published in the Academic Catalog and is limited to 50 words or fewer. See course description guidelines.

Response:
Examines the evidence and effects of climate change and uses the issue of climate change to deepen student's understanding of science and its role in society. Working collaboratively, students integrate insights from a variety of natural, social and engineering sciences to develop and evaluate climate change mitigation approaches.

Prerequisites
Indicate all requirements that must be satisfied prior to enrollment in the course. Prerequisites will be automatically checked for each student attempting to register for the course. The prerequisite will be published in the Academic Catalog and must be formulated so that it can be enforced in the registration system. Please note that upper division courses (i.e., intermediate or advanced level of instruction) must have proper prerequisites to target the appropriate audience for the course.
Courses level 3000 and above must have a prerequisite.

Response:
One Quest 1 course

Completing Prerequisites on UCC forms:

• Use "&" and "or" to conjoin multiple requirements; do not used commas, semicolons, etc.
• Use parentheses to specify groupings in multiple requirements.
• Specifying a course prerequisite (without specifying a grade) assumes the required passing grade is D-. In order to specify a different grade, include the grade in parentheses immediately after the course number. For example, "MAC 2311(B)" indicates that students are required to obtain a grade of B in Calculus I. MAC2311 by itself would only require a grade of D-.
• Specify all majors or minors included (if all majors in a college are acceptable the college code is sufficient).
• "Permission of department" is always an option so it should not be included in any prerequisite or co-requisite.

Example: A grade of C in HSC 3502, passing grades in HSC 3057 or HSC 4558, and major/minor in PHHP should be written as follows:
HSC 3502(C) & (HSC 3057 or HSC 4558) & (HP college or (HS or CMS or DSC or HP or RS minor)

Co-requisites
Indicate all requirements that must be taken concurrently with the course. Co-requisites are not checked by the registration system. If there are none please enter N/A.

Response:
N/A

Rationale and Placement in Curriculum
Explain the rationale for offering the course and its place in the curriculum.

Response:
Grounded in the Biological (B), Physical (P), or Social & Behavioral Sciences (S) subject areas of the General Education program (Gen Ed), Quest 2 courses provide second-year students thought-provoking courses that build on and expand the Quest 1 experience. Where Quest 1 asks what it means, Quest 2 asks what we can do. Rather than serve as surveys of or introductions to specific fields, Quest 2 courses reflect the instructor's expertise and challenge students as co-creators of knowledge in multi-disciplinary inquiry that uses scientific data to address pressing questions.

Course Objectives
Describe the core knowledge and skills that student should derive from the course. The objectives should be both observable and measurable.

Response:
Explain the issue and potential solutions to climate change, both qualitatively and quantitatively, with an emphasis on how the scientific method is applied to understand the different lines of evidence for climate change its effects, and relative effectiveness of different solutions.
Review and assess diverse scientific approaches used in the analysis of climate data and its

predicted effects, as well as the uncertainties associated with each.
Apply fundamental biological and physical principles to formulate testable hypotheses regarding climate change and its effects and the effects of potential climate change mitigation strategies and test these hypotheses using data.
Critically analyze the role science and climate change will play in the lives of individuals and societies and the role it might play in students' undergraduate degree programs and professional development.
Explore climate change effects and potential solutions outside the classroom and explain how engagement with those resources complements classroom work.

Course Textbook(s) and/or Other Assigned Reading
Enter the title, author(s) and publication date of textbooks and/or readings that will be assigned. Please provide specific examples to evaluate the course.

Response:
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). This textbook is required and the whole textbook will be read.

Other readings will be provided as pdf's or weblinks within Canvas. For example, during weeks 1-4:

Leiserowitz, A., Maibach, E., Roser, Renouf, C., Feinberg, G., & Rosenthal, S. (2015). Climate change in the American mind: October, 2015. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication. https://climatecommunication.yale.edu/publications/more-americans-perceive-harm-from-global-warming-survey-finds/

Understanding Science. 2019. University of California Museum of Paleontology. 3 January 2019, http://www.understandingscience.org.

Climate Change 2007: Working Group I: The Physical Science Basis, Chapter 1: Historical Overview of CC, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch1.html

Fudge, D., 2014. Fifty years of J. R. Platt's strong inference. The Journal of Experimental Biology, 217: 1202-1204.

NASA Earth Observatory Website on Paleoclimatology
http://earthobservatory.nasa.gov/Features/Paleoclimatology_SedimentCores/

Zimmerman, A.R., 2014. How science is really done.

Monnin et al., 2010. Atmospheric CO2 Concentrations over the Last Glacial Termination. Science. 291: 112-114. DOI: 10.1126/science.291.5501.112.

IPPCC Fifth Assessment Report (AR5) Home page. http://www.ipcc.ch/index.htm.

Climate Change 2013, The Physical Science Basis, Summary for Policymakers, A report of Working Group I of the IPCC (selected portions; p 4-25, 36-41 and 114-115). http://www.ipcc.ch/report/ar5/wg1/.

Climate change is an uncertain science. By John Howard. The Telegraph. 09 Nov 2013.

Sense About Science, Making Sense of Uncertainty, 2013.
http://www.senseaboutscience.org/resources.php/127/making-sense-of-uncertainty.

Curry, JA and PJ Webster, 2013. Climate change: no consensus on consensus. CAB Reviews, v8.

Doran and Zimmerman, 2009. Examining the Scientific Consensus on Climate Change, Eos, v.90

no.3. DOI: 10.1029/2009EO030002.

Weekly Schedule of Topics

Provide a projected weekly schedule of topics. This should have sufficient detail to evaluate how the course would meet current curricular needs and the extent to which it overlaps with existing courses at UF.

Response:

1 Disciplines of climate change/Interdisciplinary Science
2 Climate Drivers/Scientific Method
3 Climate History/How Science is Done
4 Climate Change and the Weather/Research and Big Data
5 CC Projections/Models
6 Ecological Impacts of CC
7 Population/Consumption/Ethics and Sustainability
8 Agriculture and Land Use/Communicating Science
9 Energy/From Lab to the Real
10 Built Environment/Effecting Change
11 Environmental Policy/Science in Action
12 Sea Level Rise/Science in the Public Realm
13 Climate Change and the Weather/Research and Big Data
14 Climate Change Solutions/ Student Group Presentations
15 Climate Change Solutions/ Student Group Presentations

Grading Scheme

List the types of assessments, assignments and other activities that will be used to determine the course grade, and the percentage contribution from each. This list should have sufficient detail to evaluate the course rigor and grade integrity. Include details about the grading rubric and percentage breakdowns for determining grades.

Response:

18% Homework (individual assessment):
3.6% 12 'Spark' On-line Discussions
14.4% 13 On-line Quizzes
2.4% In-class Attendance (individual) 13 meetings
36% In-class Activities* (group) 13 assignments
30% Final Project** (group assessment)
6.8% Mid-term Exam
6.8% Final Exam

*At each class meeting, there will be a team assignment ('In-Class Activity': answer to questions, spreadsheet calculation, etc.) that reinforces the 'Fundamental Science Topic' & 'Framework Topic'. This group activity will be turned in (via Canvas, one per group) by the end of the class meeting day (11:59 pm). Exceptions may be granted by special arrangement with the instructor. Group members should rotate assignment of lead submitter. These weekly activities/discussions (led by the instructor and/or TA) will build on lecture content by introducing qualitative and quantitative data analysis and experiential learning through real-life problem-solving. While lectures and discussions emphasize identifying and understanding major course themes, group activities challenge students to synthesize this information and create novel solutions for person, national, and international dilemmas.

**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.

Instructor(s)
Enter the name of the planned instructor or instructors, or "to be determined" if instructors are not yet identified.

Response:
Andrew R Zimmerman

Permanent Quest and General Education Approval
Please confirm that this new course request is for permanent Quest and General Education designations. Only courses which have already gone through the Temporary process may request Permanent approval.

Response:
Yes

Previous Temporary Approval
Please enter the 5 digit request number of the temporary Quest/General Education request that has previously been approved. If you are the previous submitter, this number may be found by accessing the Requests Submitted by You webpage and copying the relevant number in the 'Request' column.

Response:
14145

Which level of Quest will this course be offered under?

Response:
Quest 2

Approved Colleges - Quest 2
Only faculty from the following colleges are eligible to propose courses for Quest 2 at this time. Please confirm that you are submitting a request through an approved college by making the appropriate selection.

Response:
College of Liberal Arts and Sciences (CLAS)

Quest 2 Objectives
Please confirm that you have read and understand the Quest 2 Course Objectives and that these objectives are incorporated into the proposed course. These items must be included in the submitted syllabus.

*• Address in relevant ways the history, key themes, principles, terminologies, theories, or methodologies of the various social or biophysical science disciplines that enable us to address pressing questions and challenges about human society and/or the state of our planet. *
• Present different social and/or biophysical science methods and theories and consider how their biases and

*influences shape pressing questions about the human condition and/or the state of our planet. *
*• Enable students to analyze and evaluate (in writing and other forms of communication appropriate to the social and/or biophysical sciences) qualitative or quantitative data relevant to pressing questions concerning human society and/or the state of our planet. *
*• Analyze critically the role social and/or the biophysical sciences play in the lives of individuals and societies and the role they might play in students' undergraduate degree programs. *
*• Explore or directly reference social and/or biophysical science resources outside the classroom and explain how engagement with those resources complements classroom work. *

Response:
Yes

Quest 2 Student Learning Outcomes
Please confirm that you have read and understand the Quest 2 Student Learning Outcomes and that these outcomes have been incorporated into the proposed course. These items must be included in the submitted syllabus.

*• Content: Identify, describe, and explain the cross-disciplinary dimensions of a pressing societal issue or challenge as represented by the social sciences and/or biophysical sciences incorporated into the course. Critical Thinking: Critically analyze quantitative or qualitative data appropriate for informing an approach, policy, or praxis that addresses some dimension of an important societal issue or challenge. *
• Communication: Develop and present, in terms accessible to an educated public, clear and effective responses to proposed approaches, policies, or practices that address important societal issues or challenges.
• Connection: Connect course content with critical reflection on their intellectual, personal, and professional development at UF and beyond.

Response:
Yes

Requested GE Classification for Quest 2
Indicate the requested general education subject area designation(s) requested for this course. International and Diversity designations may only be applied to a course in conjunction with another designation.
Quest 2 courses may only select from the following General Education Subject Area designations.
You may not select both International and Diversity for a single course.

Response:
P - Physical Sciences, N - International

Requested Writing Requirement Classification
Indicate the requested Writing Requirement designation requested for this course. Quest courses may only select 2000 or 4000 words.

Response:
None

Course Updates: Temporary vs Permanent requests
Please list any substantive changes which were made to the course since temporary Quest/General Education approval was assigned. Include a rationale for each change.
Examples:

• *Course Content*
• *Assessments*
• *Learning objectives*

Response:
No substantive changes. Minor adjustments to assignments and grading scheme.

Attendance & Make-up
Please confirm that you have read and understand the University of Florida Attendance policy.
A required statement statement related to class attendance, make-up exams and other work will be included in the syllabus and adhered to in the course. Courses may not have any policies which conflict with the University of Florida policy. The following statement may be used directly in the syllabus.

• *Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx*

Response:
Yes

Accommodations
Please confirm that you have read and understand the University of Florida Accommodations policy.
A statement related to accommodations for students with disabilities will be included in the syllabus and adhered to in the course. The following statement may be used directly in the syllabus:

• *Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.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.*

Response:
Yes

UF Grading Policies for assigning Grade Points
Please confirm that you have read and understand the University of Florida Grading policies.
Information on current UF grading policies for assigning grade points is require to be included in the course syllabus. The following link may be used directly in the syllabus:

• *https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx*

Response:
Yes

Course Evaluation Policy
Please confirm that you have read and understand the University of Florida Course Evaluation Policy.
A statement related to course evaluations will be included in the syllabus. The following statement may be used directly in the syllabus:

• *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 https://gatorevals.aa.ufl.edu/public-results/. 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 https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.*

Response:
Yes

UF UNIVERSITY of FLORIDA

College of Liberal Arts and Sciences
Department of Geological Sciences

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Sept. 30, 2020

Re: Request for permanent status of Q2 Quest course: GLY 2XXX CLIMATE CHANGE SCIENCE AND SOLUTIONS

Dear *Curriculum Committee members,*

I am pleased to submit my Quest 2 course, *Climate Change Science and Solutions*, for permanent status as part of the Quest2 Gen. Ed. course offerings. I have been a faculty member of the Department of Geological Sciences for 15 years and have taught introductory level science courses geared toward non-science major undergraduates at least once, but often twice each year (including *Introduction to Oceanography*, *Sustainability and the Change Earth*, and this climate change course).

This course invites students to deepen their understanding of the practice of science by examining the complex issue of climate change. Working collaboratively and using the scientific method, we explore the multi-disciplinary evidence behind climate change and its effects and develop potential novel adaptation and mitigation solutions. The course is a natural fit to the Quest program as it deals with a corss-disciplinary topic that students know will impact strongly impact their future and the society in which they and everyone else on the planet will live. As this course relies heavily on group data analysis activities loaded with thought-provoking questions, there are many opportinities to engage with others, commuicate and self-reflect while working on larger issues of 'what can we do?", which are over-arching goals of the Quest2 program. The course topic is so complex as to require examination from the perspective of a wide range of disciplines including the natural and social sciences, but also the humanities and engineering. There is great opportunity of this course to be taught by a large number of faculty and to take part in many activities relating to climate change both within and outside the university – including research, colloquium, art exhibits, etc.

The course I propose here, grew out of my involvement with the working group for Grand Challenges General Education Program initiative for the Natural and Social Sciences. With the support of the Provost office, I led the development of this course by a team of faculty from the colleges of CLAS, CALS, DCP, and Engineering. It was first piloted in 2014 and has been offered once each year since then, with continuous revisions and improvement each year. A revised version was selected for inclusion in the Q2 program in the first round (T1) in Spring of 2019. It was offered as **IDS 2935/Sec 2PZ1** in the Spring 2020 semester and received excellent student evaluations. There

are only minor changes to the course and syllabus submitted here from the one that was approved by the Gen. Ed. and Quest2 committees last year.

Each week we focus on two paired topics, the first we call a 'fundamental science topic' is on some aspect of the science of climate change and climate change effects such as global circulation models, energy systems or environmental policy. The second topic of the week, which we call a 'framework topic' is one that moves beyond the discipline of climate change and is related to the practice of science and the role of science in society. Examples of these include 'team science', 'uncertainty', 'science ethics' and 'communicating science'. Content is delivered via lecture (1 class period) and readings and mastery is assessed via short quizzes (both as an individual and then as a team). Then, during combined periods 2 and 3 of each week, these two topics are married in an activity, carried out in teams of 3 to 4 students, that provide the opportunity for students to apply and extend the knowledge that they have pre-learned and tested. In these challenging activities, often involving working with data, critical analysis of issues, and the development and gathering of support for hypotheses, and with close monitoring and feedback provided by the instructor, students must arrive at a 'best' solution where no single correct answer exists. Teams then present their answer choice, and the educator facilitates a classroom discussion between teams to explore the topic further and arrive at conclusions and deeper insight.

During the semester project, in progressive steps with feedback provided by the instructor, student teams work collaboratively to develop and communicate a novel climate change mitigation solution. The strategies will range widely (e.g., a campus bicycle-sharing plan, electric busses for Gainesville, a change in international law), but we encourage student groups to consider a local or regional problem and solution. 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 and a final self- and peeri-assessment assignment is required.

Sincerely,

Andrew R Zimmerman

Dr. Andrew R. Zimmerman

GLY 2XXX CLIMATE CHANGE SCIENCE AND SOLUTIONS

Quest 2

I. Course Information

Spring 2022

Meeting Day/Time: T6, R6-7

Location: TBA

Primary General Education Designation: Physical Sciences

Secondary General Education Designation (if seeking): International (N)

Instructor

Andrew R Zimmerman – azimmer@ufl.edu

Office location: 364 Williamson Hall

Office hours: TBA (and by appointment)

Phone: (352) 392-0070

Teaching Assistant

TBD – tbd@ufl.edu

Office location: 225 Williamson Hall

Office hours: TBA (and by appointment)

Phone: (352) XXX-XXXX

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 have an incomplete 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.

Required & Recommended Course Materials

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.

Materials and Supplies Fees: n/a

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
2) Attend 1 period class that will focus on direct content delivery, i.e. mainly lecture by instructor (1st class meeting day)
3) Do assigned readings (in textbook and provided on-line) and take on-line quiz (before Thursday class)
4) Attend 2-period class (2nd class meeting day) in which students will 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 the end of the class meeting day. These weekly activities/discussions (led by the instructor and/or TA) will build on lecture content by introducing qualitative and quantitative data analysis and experiential learning through real-life problem-solving. While lectures and discussions emphasize identifying and understanding major course themes, group activities challenge students to synthesize this information and create novel solutions for person, 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.

II. Coursework & Schedule

1. Summary of Graded Work

18%	Homework (individual assessment):	
	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 assessment)	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

2. Weekly Course Schedule

2a. Weekly Due Dates (example)*

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

2b. Weekly Topics - Summarized

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 Anthrop. 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. Proj. 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	

2c. Weekly Topics - Detailed

Week #1

1) Fundamental Science Topic: Perceptions of Climate Change, Disciplines of Climate Change

Framework Topic(s): Interdisciplinary Science, Science communication

Skill: Course search

2) Summary:

This class introduces the idea of collaboration and interdisciplinary science. Students reflect on their perceptions (preconceptions) of climate change and then complete an engineering/design activity called the marshmallow challenge. Student groups create a climate science major curriculum.

3) Learning Objectives: *When students complete this lesson they will be able to:*

-describe course objectives and student responsibilities

-reflect on preconceived ideas of climate change

-differentiate among the diverse ways in which climate change must be studied including from many disciplines and multi-cultural multinational perspectives.

-describe aspects of collaboration for creative problem solving and its relationship with climate change and science in general.

4) Activity/Assessment

In-Class Activity: Discussion of climate change interdisciplinary nature includes multinational aspects and the undergraduate major curriculum created by the students likely includes courses with international content

5) Assigned Readings

Leiserowitz, A., Maibach, E., Roser, Renouf, C., Feinberg, G., & Rosenthal, S. (2015). Climate change in the American mind: October, 2015. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication. https://climatecommunication.yale.edu/publications/more-americans-perceive-harm-from-global-warming-survey-finds/

Week #2

1) Fundamental Science Topic: Climate Drivers**,** Climate System (Cycling, Feedback, and Thresholds)

Framework Topic(s): The Scientific Method

Skill: Formulate Hypotheses

2) Summary:

Students learn the basics of the climate system and increase their understanding of the scientific process through the online lectures and readings. Discussion and group activities are used to reinforce the online materials and promote complex understandings of the nature of science. Students think about basic hypothesis about climate change and possible approaches to testing them.

3) Learning Objectives: *When students complete this lesson they will be able to:*

- summarize the primary external drivers of Earth's global climate
- analyze global climate as a complex system
- explain the scientific method and give examples of misconceptions about science
- give examples of climate system material exchanges, feedbacks, and tipping points
- apply the scientific method to the question of climate change by generating hypotheses and devising 'experiments' to test them

4) Activity/Assessment

In-Class Activity: Students ask questions and construct hypotheses about climate change and its effects. They are encouraged to think globally and multi-nationally and cross-culturally.

Science misconceptions discussion: Emphasizes that science is now funded by multinational governments and carried out by teams of multinational scientists

5) Assigned Readings

Dire Predictions Textbook pgs. 6-29.

Understanding Science. 2019. University of California Museum of Paleontology. 3 January 2019, http://www.understandingscience.org.

Climate Change 2007: Working Group I: The Physical Science Basis, Chapter 1: Historical Overview of CC, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch1.html

Fudge, D., 2014. Fifty years of J. R. Platt's strong inference. The Journal of Experimental Biology, 217: 1202-1204.

Week #3

1) Fundamental Science Topic: Climate History

Framework Topic: How Science is Done

Skill: Spreadsheet (Excel) use, Hypothesis Testing

2) Summary:

This week, after reviewing climate history, students complete an exercise with real ice core data. After creating and examining several graphs, they are asked to form arguments for or against anthropogenic warming.

3) Learning Objectives: *When you complete this lesson students will be able to:*

- explain the different sources of climate records and the applicable timescale and resolution (uncertainties) associated with each
- recount the broad outlines of how climate has varied over Earth history (and the process controlling it)
-realize that climate data collection and sharing is an international activity
- use Excel to examine data (create columns, simple calculations, make graphs)
- understand and draw inferences from graphs of real paleoclimate data
- use paleoclimate data to test some climate change hypotheses
-understand that science is not done in a vacuum but is influenced by many 'real world' factors including funding, publishing, and personal biases

4) Activity/Assessment

On-line Discussion: Students are asked to think about the value of governmental funding of large multinational scientific efforts to extract paleoclimate records form ice and sediment cores

In-Class activity: in part, examines the 'Early Anthropocene Hypothesis' which involves understanding and discussion of early European and Asian agriculture and settlement history.

5) Assigned Readings

Dire Predictions Textbook pgs. 30-51.

NASA Earth Observatory Website on Paleoclimatology http://earthobservatory.nasa.gov/Features/Paleoclimatology_SedimentCores/

Zimmerman, A.R., 2014. How science is *really* done.

Monnin et al., 2010. Atmospheric CO_2 Concentrations over the Last Glacial Termination. Science. 291: 112-114. DOI: 10.1126/science.291.5501.112.

Week #4

1) Fundamental Science Topic: Evidence for Climate Change

Framework Topic: Uncertainty/Consensus

Skill: Sources/ Critical Thinking

2) Summary:

This week, after reviewing major lines of evidence supporting CC from lecture (and from last week's assignment), as well as some of the major uncertainties, students will do an exercise in which they come up with arguments and counter-arguments to the anthropogenic global warming hypothesis.

3) Learning Objectives: *When they complete this lesson, students will be able to:*

- recount the major lines of evidence supporting the theory of anthropogenic global warming (AGW)
- discuss various uncertainties associated with the theory of AGW and their nature
- understand the workings and role of the IPCC
- discuss the role of uncertainty and consensus in shaping scientific debates generally, and AGW specifically.
- discuss a range of counter-arguments to AGW and find and present lines of evidence that would validate or invalidate these counter-arguments
- distinguish between types of sources of information and make proper scientific citation

4) Activity/Assessment

Students critically think about the AGW argument; finding evidence supporting it, counter-arguments, discuss the method used in source and how it supports the counter-argument. Also, students discuss the biases or assumptions and include proper citation for each source.

5) Assigned Readings

Dire Predictions Textbook pgs. 30-51.

IPPCC Fifth Assessment Report (AR5) Home page. http://www.ipcc.ch/index.htm.

Climate Change 2013, The Physical Science Basis, Summary for Policymakers, A report of Working Group I of the IPCC (selected portions; p 4-25, 36-41 and 114-115). http://www.ipcc.ch/report/ar5/wg1/.

Climate change is an uncertain science. By John Howard. *The Telegraph*. 09 Nov 2013.

Sense About Science, Making Sense of Uncertainty, 2013. http://www.senseaboutscience.org/resources.php/127/making-sense-of-uncertainty.

Curry, JA and PJ Webster, 2013. Climate change: no consensus on consensus. CAB Reviews, v8.

Doran and Zimmerman, 2009. Examining the Scientific Consensus on Climate Change, Eos, v.90 no.3. DOI: 10.1029/2009EO030002.

Week #5

1) Fundamental Science Topic: Climate Change and the Weather

Framework Topic: Research and Big Data

Skill: Test hypotheses using data

2) Summary:

Students will complete an in-class activity in which they will propose and test hypotheses using weather data in excel. Difficulties with Big Data will be realized. Then, students will learn about the semester project and be assigned to groups according to their strengths.

3) Learning Objectives: *When you complete this lesson students will be able to:*

-compare and contrast weather and climate

-differentiate between changes to long-term average in climate data and changes to extremes

-describe what it means for conditions/events to be extreme

-realize the meaning of 'big data' and the challenges it presents

- evaluate key strengths individuals may bring to group collaborations

-carry out effective group 'brainstorming'

4) Activity/Assessment

In-Class Activity: Students examine weather data (climate trends) in Florida cities and compare this kind of data with that of averages for different regions of the Earth and global data depictions.

5) Assigned Readings

Dire Predictions Textbook pgs. 52-67 & 112-115 & 132-135.

Southeast Climate Consortium's agroclimate website climate fact sheets: Fundamentals of Climate variability and Change http://agroclimate.org/fact-sheets-climate.php.

Kitchin., R., Big Data, new epistemologies and paradigm shifts. Big Data & Society 2014 1. DOI: 10.1177/2053951714528481.

Kelly, T. (2001). Chapter 4 "The Perfect Brainstorm" in 'The art of innovation: Lessons in creativity from IDEO, America's leading design firm'. New York: Doubleday.

Week #6

1) Fundamental Science Topic: Future Effects of Climate Change

Framework Topic: Models

Skill: Hypothesis testing/Model interpretation

2) Summary: Students think about and use climate models to make and test hypotheses

3) Learning Objectives: *When students complete this lesson they will be able to:*

- outline the purpose and types of models used in science generally and climate science specifically
- evaluate the relative degree that difference forcing impact the climate system and global temperatures
- understand how regional/global models are used and can inform national and international climate policy decisions

4) Activity/Assessment

In-Class Activity: Students use output of climate model run scenarios to make arguments that will inform international policy makers

5) Assigned Readings

Dire Predictions Textbook pgs. 68-117.

Goosse H., P.Y. Barriat, W. Lefebvre, M.F. Loutre and V. Zunz, (2008-2010). Introduction to climate dynamics and climate modeling. Online textbook available at http://www.climate.be/textbook, Modelling the climate system.

Constructing a Climate Model, 2012 by the National Academy of Sciences. http://nas-sites.org/climate-change/climatemodeling/page_3_1.php.

Week #7

1) Fundamental Science Topic: Ecological Impacts of Climate Change

Framework Topic: Team Science

Skill: Team Work/Hypothesis Writing

2) Summary:

A group activity provides students with a team science experience. After reading section of a paper on the Amazon, they meet in groups of disciplinary experts. Then experts are separated into interdisciplinary groups that develop then present a research proposal.

3) Learning Objectives: *When you complete this lesson students will be able to:*

- define ecosystems and how ecosystems are linked to climate
- name key impacts of climate change on ecosystems
- understand the role of humans as components of Earth's ecosystems
- appreciate socioeconomic conditions in various regions of the world place differeing pressures and demands on ecological systems

- experience the value of team effort and synthesis of different scientific disciplinary perspectives, in many scientific endeavors

4) Activity/Assessment

In-Class Activity: Students consider the *interactions between climate change, humans and the ecological health of the Amazon Rainforest. Students will also consider/discuss the roles of international teams of research scientists working in Brazil, national policies of Brazil, and lifestyles and cultures of humans living in the region.*

5) Assigned Readings

Dire Predictions Textbook pgs. 124-131 & 188-189.

Davidson, E.A. et al., 2012. The Amazon basin in transition. Nature 481, 321-328. doi:10.1038/nature10717.

Costanza et al., 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.

Holgate, S.A., 2014. How to Collaborate. *Science*. 10.1126/science.caredit.a1200082

Week #8

1) Fundamental Science Topic: Human Population/ Consumption

Framework Topic: Ethics & Sustainability

Skill: Calculations/Units

2) Summary:

Students will learn about how population growth and climate change are linked and how mitigation and adaptation strategies must be made with ethical considerations.

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Describe how resource use combined with population growth varies in different regions of the Earth, along with its effects.

-Evaluate different strategies for how individual countries and their population contribute to CO2 emission reduction goals.

-Realize the implications of our personal lifestyle choices and consumption patterns on the resources that are available to others in different regions of the Earth

-Realize the linkages between ethics and climate change

4) Activity/Assessment

In-Class Discussion: After calculating their carbon footprint (and that of average Americans), students think about and discuss why it differs from that of residents of other countries and cultures.

In-Class Activity - By apportioning future emission scenarios over the 21st century among the world's different countries, students come up with a plan to reduce C emissions so that the critical temperature is not reached before 2100. The plan needs to be based on the data, consider various socioeconomic and cultural factors and an ethical framework that can be justified.

In-Class Discussion: We conclude with a discussion of international climate change treaties: Kyoto Protocol and Paris Agreement

5) Assigned Readings

Dire Predictions Textbook pgs. 150-163 & 184-187.

Center for Research on Environmental Decisions. (2009). The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public. New York.

Global Warming's Six Americas in December 2018. Report by Yale Project on Climate Change Communication and the George Mason University Center for Climate Change Communication.

UNEP (2014) Assessing Global Land Use: Balancing Consumption with Sustainable Supply. A Report of the Working Group on Land and Soils of the International Resource Panel. Bringezu S., Schütz H., Pengue W., O´Brien M., Garcia F., Sims R., Howarth R., Kauppi L., Swilling M., and Herrick J.

Week #9

1) Fundamental Science Topic: Agriculture and Land Use

Framework Topic: Communicating about climate change to the public

Skill: Working with Google Docs, Communication

2) Summary: Consider how we currently feed the world (or don't), what changes to our food system will occur due to CC, and what we can do about it, including, how, through proper communication techniques, we can actually make the necessary changes happen.

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Consider competition for land & other natural resources among urban, agricultural and natural systems within the context of increasing population densities and climate change.

-Appreciate how agricultural and foodways practices vary across nations and cultures

-Understand climate-related risks associated with agriculture and ways in which farmers can prepare for and adapt to these changes

-Appreciate the diverse communication strategies required to build adaptive capacity among different audiences.

4) Activity/Assessment

In-Class Activity – Student groups are each assigned a major world commodity crop for which they collect data and then, comparatively, evaluate the role they now play in different regions and cultures, and might play in the future, in supporting humanity.

In-Class Activity: Students will work in groups to develop solutions to simultaneously protect our natural systems, feed growing world populations, and build healthy communities. Student will be encouraged to develop 'food and land' solutions for other regions and cultures. These are presented to the class.

5) Assigned Readings

Dire Predictions Textbook pgs. 136-149 & 206-207.

Gardiner, S. M. & Hartzell-Nichols, L., 2012. Ethics and Global Climate Change. Nature Education Knowledge 3(10):5.

Rockstrom et al., 2009. A safe operating space for humanity. Nature 461: 472-475

Broome, J., 2008. The Ethics of Climate Change. *Scientific American*, **298**, 96-102.

Mata FJ, Onisto LJ, Vallentyne JR (2012) Consumption: the other side of population for development. Ethics Sci Environ Polit 12:15-20. https://doi.org/10.3354/esep00122.

Week #10

1) Fundamental Science Topic: Energy

Framework Topic(s): From Lab to the Real

Skill: Communication, Sources

2) Summary: Students think about and investigate a range of specific measures that reduce CO2 emissions and see that they, without too much pain, add up to quite a ways toward the needed reduction (to prevent reaching the critical temp.).

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Understand characteristics of different forms of energy (renewable energy and nonrenewable) and their relative contribution in powering the U.S. versus other nation's economy.

-Evaluate the efficacy and feasibility of different actions that could be done to reduce energy consumption (CO_2 emissions)

4) Activity/Assessment

On-line Discussion: Students consider/compare U.S. and China energy and climate policy.

In-Class Discussion: The focus of this week's activity is on the U.S. energy system but we end with a discussion of its implications for the recent agreement between U.S. and China on lowering emissions and compare the U.S. and Chinese energy and climate system and policies.

5) Assigned Readings

Dire Predictions Textbook pgs. 164-177 & 182.

Project Drawdown Electricity Sector Summary: https://drawdown.org/solutions/electricity-generation

Hites, R.A. How To Give a Scientific Talk, Present a Poster, and Write a Research Paper or Proposal, Environ. Sci. Technol. 2014, 48, 9960−9964. dx.doi.org/10.1021/es503552t.

Rühl, C., P. Appleby, J. Fennema, A. Naumov, M. Schaffer, Economic development and the demand for energy: A historical perspective on the next 20 years, Energy Policy, Volume 50, November 2012, Pages 109-116, ISSN 0301-4215. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/economic-development-demand-for-energy.pdf

Week #11

1) Fundamental Science Topic: Built Environment

Framework Topic: Effecting Change

Skill: Oral presentation, Evaluation and Project Planning, Creative Design

2) Summary:

Students present their project outlines, give and receive feedback.

Activity may be 1) project evaluation and planning, or 2) Built Environment Design Activity

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Detail the impact of the built environment on climate change

-Describe how modifications to the built environment can reduce climate change

-Demonstrate that individual choices impact carbon emissions and climate

- Prepare a sound oral/visual presentation.

- Accept criticism and suggestions for project improvement.

- Create a plan for project completion

4) Activity/Assessment

Students design a sustainable piece of infrastructure (community, building, transportation route, etc.) and surroundings that will help Gainesville mitigate and/or adapt to CC. The design process starts with conceptualization (a sketch perhaps) and then progressively becomes more refined, adding more and more levels of detail. Students must annotate your final product with at least 6 features from LEED categories.

5) Assigned Readings

Dire Predictions Textbook pgs. 178-199.

Bertaud, A. and Richardson, H.W. (2004), "Transit and density: Atlanta, the United States and Western Europe", in Bae, C. and Richardson, H.W. (Eds), Urban Sprawl in Western Europe and the United States, Ashgate, Aldershot, pp. 293-310.

Ewing R, Schmid T, Killingsworth R, Zlot A, Raudenbush S., 2003. Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity. Am. J. Health Promot. 2003 Sep-Oct;18(1):47-57.

Week #12

1) Fundamental Science Topic: Environmental Policy: Climate Change

Framework Topic: Science in action

Skill: Finding/evaluating Sources/Calculation

2) Summary:

After a review, students look at and compare different environmental policies.

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Compare legal frameworks for international, national, state, and local climate change policy.

-Discuss different categories of CC policy options

- Differentiate between market incentive and regulation.

- Evaluate the strength of different sources of data and build skepticism for all that they read in the press

4) Activity/Assessment

In-Class Activity: Students investigate the details of, present, then compare and contrast in a final discussion, different governmental environmental policies from around that world that have had the greatest effects on mitigating climate change. These include examples from European Union, China, U.N. developing countries, etc.

5) Assigned Readings

Dire Predictions Textbook pgs. 200-213.

Curbing climate change: The deepest cuts. The Economist, 2014. https://www.economist.com/briefing/2014/09/20/the-deepest-cuts

Nachmany, M. and J. Setzer. Global trends in climate change legislation and litigation 2018 snapshot. Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, 2018. http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/04/Global-trends-in-climate-change-legislation-and-litigation-2018-snapshot-3.pdf

Week #13

1) Fundamental Science Topic: Sea Level Rise

Framework Topic: Science in the Public Realm

Skill: Debate

2) Summary:

Students are divided into stakeholder groups, prepare suggestions for sea level rise policy from the stakeholder perspective, and then role play in a public forum concerning sea level rise policy in Volusia County. This serves as a capstone experience that connects the students' scientific learning to the formation of public policy.

3) Learning Objectives: *When students complete this lesson they will be able to:*

-Explain the mechanisms that cause both global and relative sea level variation.

-Outline the history and causes of sea level variation in the past and predictions for the future.

-Detail the potential impacts of sea level rise and possible societal response strategies in various regions of the U.S. and the world.

-Evaluate the role of science in society, particularly in policy development.

-Describe how public policy on wicked problems such as climate change or sea level rise might best be made and implemented in various regions of the U.S. and the world.

4) Activity/Assessment

In-Class Activity – In this activity, students play the role of different stakeholder groups in making recommendations on sea level rise adaptation policy/regulations to be adopted by a Florida county. While focusing on Florida, this activity leads students to understand how geographic location and socioeconomic factors affect the lives and views of citizens. Students are asked at end to imagine how their policy recommendations might differ were they to be citizens of a different country.

5) Assigned Readings

Dire Predictions Textbook pgs. 36-37 & 110-111 & 122-123 & 158-159.

Larson, B., 2009. Scientizing Politics: The Honest Broker: Making Sense of Science in Policy and Politics by Roger A. Pielke, Jr., Alternatives Journal 35:2 2009

Miami: How Rising Sea Levels Endanger South Florida, Jeff Goodall, *Rolling Stone*, 2013, https://www.rollingstone.com/politics/politics-news/miami-how-rising-sea-levels-endanger-south-florida-200956/

Hallegatte, Stephane, Green, Colin, Nicholls, Robert J., and Corfee-Morlot, Jan. 2013. Future flood losses in major coastal cities, Nature Climate Change, 3: 802.

Semester Project

Students groups will work as a team to propose, hypothesis and quantitatively evaluate the potential effects of a strategy to mitigate climate change.

We encourage student groups to consider a local or regional problem and solution - be it state of Florida, Gainesville, or on the UF campus or even in one's dormitory), but it is important that the project also be evaluated from an international and multi-cultural perspective as well. Each group will start with a hypothesis, then work to test the hypothesis and quantitatively evaluate the efficacy of the strategy by weighing the calculated costs against the potential benefits that would result from the adoption of their strategy (climate, human health, economic, etc.) or by comparing the action to a different course of action. At the end of the assignment (in both presentation and paper), students are required to evaluate the efficacy of the project were it to be carried out in other regions of the U.S. and the world. What economic, social or cultural barriers might there be in other locations?

Week 14:

Group Oral Presentation of Semester Project - See posted 'Semester Project Student Handout' in the Semester Project Module for details on what information to include.

Week 15:

Group Oral Presentation of Semester Project (continued as necessary)

Wrap up and review for final exam. Reflect on what we learned about climate change science and solutions, on what we as a society and individuals can do. Reflect on how the responsibility for and effects of climate change vary among nations, cultures and with socioeconomic factors worldwide.

Submit Individual Assessment - This will include a self-reflective evaluation of: 1) the role that you and others in your group played in completing the semester project, 2) the success of the collaborative efforts of your group, 3) how the course content has affected your intellectual, personal, and professional development.

III. Grading

3. Description of Graded Work

3a. Attendance and Participation:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Attendance: will be taken daily and recorded in the Canvas gradebook. You are allowed one 'personal day' for the semester, after which each absence that does not meet university criteria for "excused" will result in a two-point deduction from your final grade. 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.

Participation: Consistent informed, thoughtful, and considerate class participation is expected and will be evaluated using the rubric below. The instructor will inform you of your participation grade to date when mid-term exams are returned and schedule a conference if you are earning below 70% of the possible points.

NOTE: If you have personal issues that prohibit you from joining freely in class discussion, e.g., shyness, language barriers, etc., see the instructor as soon as possible to discuss alternative modes of participation.

3b. 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.

3c. 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), 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 materials of the course.

3d. In-Class Activities

At each class meeting, there will be a team assignment ('In-Class Activity': answer to questions, spreadsheet calculation, etc.) that reinforces the 'Fundamental Science Topic' & 'Framework Topic'. This group activity will be turned in (via Canvas, one per group) by the end of the class meeting day (11:59 pm). Exceptions may be granted by special arrangement with the instructor. Group members should rotate assignment of lead submitter. These weekly activities/discussions (led by the instructor and/or TA) will build on lecture content by introducing qualitative and quantitative data analysis and experiential learning through real-life problem-solving. While lectures and discussions emphasize identifying and understanding major course themes, group activities challenge students to synthesize this information and create novel solutions for person, national, and international dilemmas. These assignments will not be accepted after 1 week following the class. See grading rubric at end of syllabus.

3e. 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. See grading rubric at end of syllabus.

4. Grading 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 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 minimum grade of C is required for general education credit. Courses intended to satisfy the general education requirement cannot be taken S-U.

For information on how UF assigns grade points, visit: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

IV. Quest Learning Experiences

5. Details of Experiential Learning Component

For the semester project will take students beyond just reading, writing, and learning about what others have said or concluded by asking them to *create and evaluate* a strategy to mitigate climate change. In groups of 3-4, students will work as a team to develop and quantitatively evaluate a strategy that will reduce the causes or effects of climate change. The strategies could range widely, e.g., from a solar-powered bicycle to a change in international law. While students are encouraged to consider a local or

regional problem and solution, 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, both an oral presentation will be made to the class. More details can be found on the course website.

We will also 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.

Extra credit will also be awarded to students that attend special Climate Change-related events as they occur around UF or Gainesville including museum exhibits (including art), films, public lectures and symposia. A short (1 page) write-up of the event is required.

6. Details of Self-Reflection Component

This course invites students to deepen their understanding of the practice of science by examining the complex issue of climate change. Each week, student groups carry out activities that force students to consider, not just what we know, but how we know it, and what we, as a society, and as individuals, can and should do about it. It also always asked students to consider how the effects and potential solutions to climate change may vary among nations and with socioeconomic factors and cultures worldwide.

A final project and presentation forces students to self-reflect and consider the actions that they might carry out, now or in the future, to help solve the problem climate change. It also requires students to consider the importance of science (reason and quantitative analysis) in choosing the most effective solution to any personal or societal problem.

V. General Education and Quest Objectives & SLOs

7. This Course's Objectives—Gen Ed Primary Area and Quest

Physical Sciences + Quest 2 + Course Objectives

Physical Sciences Objectives ➔	Quest 2 Objectives ➔	This Course's Objectives ➔	Objectives will be Accomplished By:
Physical science courses will provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences.	Quest 2 courses will address in relevant ways the history, key themes, principles, terminologies, theories, or methodologies of the various social or biophysical science disciplines that enable us to address pressing questions and challenges about human society and/or the state of our planet.	This course will explore the issue and potential solutions to climate change, both qualitatively and quantitatively, with an emphasis on how the scientific method is applied to understand the different lines of evidence for climate change its effects, and relative effectiveness of different solutions.	This objective will be accomplished through a combination of lectures, literature readings and other media, weekly group data analysis activities involving climate, economic, sociogeographic data.
Physical science courses will focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems.	Quest 2 courses will present different social and/or biophysical science methods and theories and consider how their biases and influences shape pressing questions about the human condition and/or the state of our planet.	This course will review and assess diverse scientific approaches used in the analysis of climate data and its predicted effects, as well as the uncertainties associated with each.	This objective will be accomplished through a combination of lectures, literature readings and other media, weekly group data analysis activities involving climate, economic, sociogeographic data.
In physical science courses, students will be able to formulate empirically-	Quest 2 courses will enable students to analyze and evaluate (in writing and other forms of	This course will apply fundamental biological and physical principles to formulate testable hypotheses	This objective will be accomplished in weekly group data analysis activities involving

Physical Sciences Objectives ➔	Quest 2 Objectives ➔	This Course's Objectives ➔	Objectives will be Accomplished By:
testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.	communication appropriate to the social and/or biophysical sciences) qualitative or quantitative data relevant to pressing questions concerning human society and/or the state of our planet.	regarding climate change and its effects and the effects of potential climate change mitigation strategies and test these hypotheses using data.	climate, economic, sociogeographic data. Formulating and testing a hypothesis with regard to the effectiveness of a student group-proposed CC mitigation strategy is also the subject of the semester project, which will be orally presented.
	Quest 2 courses will analyze critically the role social and/or the biophysical sciences play in the lives of individuals and societies and the role they might play in students' undergraduate degree programs.	This course will critically analyze the role science and climate change will play in the lives of individuals and societies and the role it might play in students' undergraduate degree programs and professional development.	This objective will be accomplished through weekly group data analysis activities involving climate, economic, sociogeographic data, which always ask students to discuss (and write) the implications of their findings on their individual behavior, societal policy, and academic path.
	Quest 2 courses will explore or directly reference social and/or biophysical science resources outside the classroom and explain how engagement with those resources complements classroom work.	This course will explore climate change effects and potential solutions outside the classroom and explain how engagement with those resources complements classroom work.	This objective will be accomplished through announcements and encouragement (via extra credit points) to visit several climate change research facilities during a class field trip and to attend local climate change-related events as they occur around UF or Gainesville including museum exhibits (including art), films, public lectures and symposia. A

Physical Sciences Objectives ➔	Quest 2 Objectives ➔	This Course's Objectives ➔	Objectives will be Accomplished By:
			short (1 page) write-up of each event describing how they relate to classroom work is required.

8. This Course's Student Learning Outcomes (SLOs)—Gen Ed Primary Area and Quest

Physical Sciences + Quest 2 + Course SLOs

	Physical Sciences SLOs ➔	Quest 2 SLOs ➔	This Course's SLOs ➔	Assessment
Content	Students will be able to identify, describe, and explain the basic concepts, theories and terminology of natural science and the scientific method; the major scientific discoveries and the impacts on society and the environment; and the relevant processes that govern biological and physical systems.	Students will be able to identify, describe, and explain the cross-disciplinary dimensions of a pressing societal issue or challenge as represented by the social sciences and/or biophysical sciences incorporated into the course.	Students will be able to identify, describe, and explain the cross-disciplinary (physical, biological, sociological) dimensions of climate change causes, effects, and potential solutions.	Student competencies will be assessed through weekly on-line quizzes, group activities, and a semester project (which includes written building assignments and a final presentation) and a mid-term and final exam.

	Physical Sciences SLOs ➔	Quest 2 SLOs ➔	This Course's SLOs ➔	Assessment
Critical Thinking	Students will be able to formulate empirically-testable hypotheses derived from the study of physical processes or living things; apply logical reasoning skills effectively through scientific criticism and argument; and apply techniques of discovery and critical thinking effectively to solve scientific problems and to evaluate outcomes.	Students will be able to critically analyze quantitative or qualitative data appropriate for informing an approach, policy, or praxis that addresses some dimension of an important societal issue or challenge.	Students will be able to critically analyze and evaluate qualitative and quantitative data climate data along with economic and sociogeographic data to draw conclusions as to the causes, effects and best responses to the problem of climate change.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation) and a mid-term and final exam.
Communication	Students will be able to **c**ommunicate scientific knowledge, thoughts, and reasoning clearly and effectively.	Students will be able to develop and present, in terms accessible to an educated public, clear and effective responses to proposed approaches, policies, or practices that address important societal issues or challenges.	Students will be able to develop and present in writing and orally, the analysis of qualitative and quantitative data, and logic to draw reasonable conclusions regarding climate change causes, effects and solutions.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation) and a mid-term and final exam.
Connection	N/A	Students will be able to connect course content with critical reflection on their intellectual, personal, and professional development at UF and beyond.	Students will be able to reflect on the role that science and climate change will play in the lives of individuals and societies and the role it might play in students' undergraduate degree programs and professional development.	Student competencies will be assessed through weekly group activities and a final graded self-assessment assignment.

9. Secondary Objectives and SLOs

International Objectives (for N co-designation)

International Objectives ➔	This Course's Objectives➔ **(This course will….)**	Objectives will be Accomplished By: (This course will accomplish the objective in the box at left by…)
International courses promote the development of students' global and intercultural awareness.	**This course will** use the issue of climate change, and the examination of the process of science in general, to promote the development of students' global and intercultural awareness.	This will be accomplished through a combination of literature readings and other media, weekly group data analysis activities involving climate, economic, sociogeographic data that ask students to reflect on how the causes, effects and efficacy of different solutions to climate change vary between regions and cultures of the world.
Students examine the cultural, economic, geographic, historical, political, and/or social experiences and processes that characterize the contemporary world, and thereby comprehend the trends, challenges, and opportunities that affect communities around the world.	**This course will** use the issue of climate change, and the examination of the process of science in general, to examine the cultural, economic, geographic, historical, political, and social experiences and processes that characterize the contemporary world, along with trends, challenges, and opportunities that affect communities around the world.	This will be accomplished through weekly group data analysis activities involving climate, economic, sociogeographic data, as well as the semester project, that ask students to reflect on how cultural, economic, geographic, historical, political, and/or social experiences and processes that characterize the contemporary world, along with trends, challenges, and opportunities that affect communities around the world.
Students analyze and reflect on the ways in which cultural, economic, political, and/or social systems and beliefs mediate their own and other people's understanding of an increasingly connected world.	**This course will** use the issue of climate change, and the examination of the process of science in general, to analyze the ways in which cultural, economic, political, and/or social systems and beliefs mediate people's	This will be accomplished through weekly group data analysis activities involving climate, economic, sociogeographic data, as well as the semester project, that ask students to reflect on the ways in which cultural, economic, political,

International Objectives ➔	This Course's Objectives➔ **(This course will….)**	**Objectives will be Accomplished By:** (This course will accomplish the objective in the box at left by…)
	understanding of an increasingly connected world.	and/or social systems and beliefs mediate their own and other people's understanding of an increasingly connected world.

International Student Learning Outcomes (for N co-designation)

	International SLOs ➔	Course SLOs ➔	Assessment
Content	Students will be able to identify, describe, and explain the historical, cultural, economic, political, and social experiences and processes that characterize the contemporary world.	Students will be able to explain the historical, cultural, economic, political factors that contribute to the variation in causation of climate change across nations of the world.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation). See grading rubrics.
		Students will be able to explain in depth how the effects of climate change vary across nations and with socioeconomic factors and cultures worldwide.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation). See grading rubrics.
		Students will be able to identify and describe the values, attitudes and norms that shape the attitudes toward climate change in citizens of various countries.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation). See grading rubrics.
Critical Thinking	Students will be able to analyze and reflect on the ways in which cultural, economic, political, and/or social systems and beliefs mediate understandings of an increasingly connected contemporary world.	Students will be able to analyze the ways in which cultural, economic, political, and/or social systems and beliefs shape the causation and understandings and potential solutions of climate change in various regions of the world.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation). See grading rubrics.
		Students will be able to evaluate the cultural, economic, political factors that will influence the efficacy of a proposed climate change mitigation strategy in various regions of the world.	Student competencies will be assessed through weekly group activities, and a semester project (which includes written building assignments and a final presentation). See grading rubrics.

VI. Required Policies

10. Students Requiring Accommodation

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

11. UF Evaluations Process

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 https://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 https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

12. University 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 (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-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.

13. Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

14. The Writing Studio

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at http://writing.ufl.edu/writing-studio/ or in 2215 Turlington Hall for one-on-one consultations and workshops.

VII. Grading Rubrics

1. Participation Grading Rubric (3% of final grade):

Participation is assessed by the instructor using contribution from the teaching assistant and an end-of-semester Canvas submission from each member of the student's activity group as well as a self-assessment. It includes participation in weekly in-class activity as well as in semester project group.

	High Quality	Average	Needs Improvement
Informed: Shows evidence of having done the assigned work with constructive input.	**10 points.** Student fully informed and prepared for class group activity.	**6-9 points.** Student moderately prepared for class group activity.	**1-5 points.** Student unprepared or minimally prepared for class activity.
Thoughtful: Shows evidence of having understood and considered issues raised.	**10 points.** Student considers myriad aspects of class group activity.	**6-9 points.** Student considers only nominal aspects of class group activity.	**1-5 points.** Student not engaged in subject discussed for class group activity
Considerate: Takes the perspective of others into account.	**10 points.** Student works well within assigned class group.	**6-9 points.** Student less considerate of others in class.	**1-5 points.** Student not considerate of others in class.

2. Weekly In-class Activity Grading Rubric

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.	1.0 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

3. Semester Project Grading Rubric

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			