



Application Form for General Education and Writing/Math Requirement Classification

Current Information:

- I. A.) DEPARTMENT NAME: _____
- B.) COURSE NUMBER, and TITLE: _____
- C.) CREDIT HOURS: _____ D.) PREREQUISITES: _____
- E.) CURRENT CLASSIFICATION
1. General Education Code: B C D H M N P S None
 2. Writing Requirement: E2 E4 E6 None
 3. Math Requirement: M None

Requests:

II. GENERAL EDUCATION

- A.) Requested Classification: B C D H M N P S
- B.) Effective Date: Fall Spring Summer _____(year)
- Or
- 1-time Approval Fall Spring Summer _____(year)

III. WRITING REQUIREMENT

MATH REQUIREMENT

- A.) Requested Classification E2 E4 E6
- B.) Effective Date: Fall Spring Summer _____(year)
- Or
- 1-time Approval Fall Spring Summer _____(year)
- C.) Assessment:
- 1.) What type of feedback will be provided to the student (in reference to writing skill)?
_____ Grade _____ Corrections _____ Drafts _____ Other
 - 2.) Will a published rubric be used?

IV. ATTACH A DETAILED SYLLABUS

V. SYLLABUS CHECKLIST

Courses that offer students General Education and/or Writing Requirement credit must provide clear and explicit information for the students about the classification and requirements.

A.) For courses with a **General Education** classification, the syllabus should include:

- Statement of the General Education Purpose of the Course with attention to the General Education Classification requested
- List of assigned General Education Student Learning Outcomes
- List of any other relevant Student Learning Outcomes
- List of required and optional texts
- Weekly course schedule with sufficient detail (e.g. topics, assigned readings, other assignments, due dates)

B.) For courses with **Writing Requirement (WR)** classification, the syllabus should include:

- "The Writing Requirement ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning."
- "Course grades now have two components: To receive writing credit, a student must receive a grade of "C" or higher and a satisfactory completion of the writing component of the course."
- A statement or statements indicating that the instructor will evaluate and provide feedback on the student's written assignments with respect to grammar, punctuation, usage of standard written English, clarity, coherence, and organization
- Assignment word counts, page lengths, submission deadlines and feedback dates

Additionally, the syllabus must clearly show that the course meets the WR to

- Evaluate [2,000/4,000/6,000] written words in assignments during the semester
- Provide all feedback on assignments prior to the last class meeting

Important note: The following types of writing assignments **CANNOT** be used to meet the WR: teamwork, exam essay questions, take-home exams, and informal, ungraded writing assignments.

VI. SUBMISSION AND APPROVALS

Department Contact:

Contact Name: _____

Phone _____ Email _____

College Contact:

College Name: _____

College Contact Name: _____

Phone _____ Email _____

SYLLABUS: IUF2100 – CLIMATE CHANGE SCIENCE AND SOLUTIONS

Spring 2016, Section 02AD, Meeting: MAEB 229, Thursday 7th-8th period (1:55-3:50 pm)

INSTRUCTORS

Lead Instructor: Dr Andrew Zimmerman, Department of Geological Sciences

Office: 364 Williamson Hall Ph# 392-0070 e-mail: azimmer@ufl.edu Office meeting: by appointment

Section Instructor (TA): Eric Stubbs, Department of Agricultural Education and Communication Office: ROL411

Office Hours: T, R 1:00 – 1:50 pm (or by appt.) e-mail: ericeric@ufl.edu

COURSE DESCRIPTION

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 will explore the multi-disciplinary evidence behind climate change and its effects and develop potential novel adaptation and mitigation solutions and to communicate this work effectively.

Prerequisites: none

Credits: 3

Course Fee: none

Gen. Ed. Fulfillment: P

Course Objectives

This physical science general education course will cover concepts of climate change and our modern society. It is the aim of this course that by the end, students will be able to:

- Understand the basic facts and uncertainties regarding climate change, the role of humans in causing it, and its possible effects on a variety of natural and human systems.
- Apply the process of scientific inquiry in discovering, understanding, and addressing the challenges of climate change.
- Develop hypothesis-driven solutions to climate change through critical evaluation and teamwork.
- Effectively communicate multi-disciplinary scientific challenges and strategies for addressing them.

Course Structure

The course will require both on-line and in-class participation. Each week, students will explore on-line content (about 2 hours total) that will include:

- 1) Completion of a 'Spark' Discussion (by Monday 11:59 pm)
- 2) Readings and on-line lectures
- 3) A quiz on the on-line materials (completed by Wednesday 10:00 pm)

Each week, in class, students will:

- 1) Review and discuss on-line material
- 2) Complete an In-Class Activity that reinforces the 'Fundamental Science Topic' & 'Framework Topic' and practices the 'Science Skill' for that week (usually turned in on-line within 2 days of class – see below)

In addition, students will work on a semester-long group project, both in and outside of class that will develop a novel approach to addressing one or more climate change-related issues. Students are required to bring a laptop or other web-enabled device to each class meeting and are also required to participate in an all-day field trip on one Saturday of the semester and take the midterm exam one evening of the semester.

COURSE WEBSITE and COMMUNICATION

Course Website

The course will run via **Canvas** through the UF e-learning website; go to <http://lss.at.ufl.edu/> and click on the Canvas Login button. The course site will be used to post relevant announcements, reading, lecture materials, links, assignments and quizzes, etc. You are responsible for checking this site for updates, announcements and to verify that your grades are recorded correctly. No grade will be changed more than one week following the date it was turned in. It is recommended that students adjust Canvas settings so that Announcements are sent to phone or email.

Questions and Comments on course logistics (e.g. assignments, grading etc.) and on content (e.g. science or policy questions directed toward any of the course instructors) should be posted in two respective discussion boards within the course website. Questions of a personal nature (e.g. medical emergency, legal, documented disability accommodation, etc.) should be sent to the TA via e-mail who will forward these to the faculty instructor as necessary.

Required Textbook

Dire Predictions: Understanding Global Warming, by Mann and Kump, 2009, Prentice Hall (\$15 new on Amazon or at the UF bookstore for about \$37)

In addition, there will be numerous selected readings posted or linked through the course website weekly.

ASSESSMENTS AND GRADING

Final Grade Calculation

25%	<u>Homework:</u>	
	5% 12 'Spark' Discussions (2 lowest dropped)	[0.5% each = 5 pts]
	20% 12 Quizzes (2 lowest dropped)	[2% each = 20 pts]
30%	<u>In-class Activities</u> (some individual, some group work), 12 assignments, lowest 2 will be dropped	[3% each = 30 pts]
30%	<u>Final Project</u>	
	Initial Proposal (group assessment)	[3% = 30 pts]
	Hypothesis and Quant. Method (group assessment)	[5% = 50 pts]
	Midpoint Presentation (group assessment)	[3% = 30 pts]
	Final Presentation (group assessment)	[8% = 80 pts]
	Final Paper (group assessment)	[8% = 80 pts]
	Statement of Effort (individual assessment)	[3% = 30 pts]
15%	<u>Mid-term Exam</u> (No Final Exam)	[= 150 pts]

Final Grade Scale

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

***Note:** An earned grade of 'C-' grade or below does not qualify for major, minor, Gen Ed, or college basic distribution credit.

For further information on UF's Grading Policy, consult:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Discussions

Students have from the end of class (Thursday 5 pm) till Monday 11:59 pm to complete the on-line 'Spark' Discussion. Each student should make one substantive original comment and one substantive response to the

comment of another student. That is, students must read what has been said before and add something more than a few words of agreement or disagreement. No credit will be given for late submissions.

Quizzes and Exams

Quizzes each week will be taken by students on Canvas by midnight of the day before class and will consist of 12-20 multiple choice questions on the lecture and reading material presented on-line that week. It is also possible that an additional on-line homework activity will be assigned. In addition, students should bring any questions they may have to class, brought to mind by the online material. Quizzes can be completed up to 1 week after they are due, not later, but will be penalized 6 (of 20) points.

The Midterm Exam will be given on campus in the evening of Feb. 16, closed book, 2 hour limit. 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 attending the exam at this time, this should be discussed with the TA prior to the date.

In-Class Activities

For each class meeting, there will be a short assignment (short essay, a few short answer questions) to be completed and turned in, usually via Canvas (Assignment Tab) by the following evening (Friday 11:59 pm). These may be individual or group assignments. Late assignments will lose 6 of 30 possible points and these assignments will not be accepted after 1 week following the class. Full credit will be awarded as follows:

6 points – Assignment is submitted by the due date

6 points – Fundamental Science/Framework Topic: assignment is focused, coherent, and correct... successfully integrates examples with explanations, supporting evidence and analysis.

6 points – Core Skill: demonstration of knowledge and application of the skill

6 points – Individual Effort

6 points – Level of engagement with the topic

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 or adapt to climate change. The strategies will range widely, e.g., from a solar-powered bicycle to 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 (climate, human health, economic, etc.). 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 and a written presentation will be due. More details will follow.

Extra Credit

Possibilities for extra credit will be announced during the semester. These will be available to all and will not be offered on an individual basis.

COURSE AND UNIVERSITY POLICIES

Attendance and Absence

Students are expected to complete all requirements (quizzes, exams, presentation) on the specified dates and will not be granted an alternate date unless they have an acceptable reason for their absence (e.g., absences due to medical emergency, observance of religious holidays, military obligation) and pre-arranged consent of the instructor. These requests must be timely and accompanied by all necessary written documentation. This policy is accordance with UF's attendance policies, which can be reviewed further at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>. Discussions, quizzes and assignments turned in late will suffer a loss of points spelled out in each section above. No assignment can be turned in more than 1 week after its due date without instructor consent.

Classroom policy

Students are required to bring to each class meeting a laptop or similar device for use in taking notes, summarizing in-class activities, and accessing the internet. However, use of mobile devices and computers during class for purposes other than viewing readings or conducting sanctioned research is not allowed. Cell phones must be turned off during class. Students who receive or make calls or text messages or engage in other disruptive behavior during class will be asked to leave and will not be allowed to turn in the assignment due on that day. Students should also bring pen/pencil and paper to each class.

Academic Honesty Policy

Students must conform to UF's academic honesty policy regarding plagiarism and other forms of cheating. This means that 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 university specifically prohibits cheating, plagiarism, misrepresentation, bribery, conspiracy, and fabrication. For more information about the definition of these terms and other aspects of the Honesty Guidelines, see <http://www.dso.ufl.edu/sccr/process/student---conduct---honor---code/>. All students found to have cheated, plagiarized, or otherwise violated the Honor Code in any assignment for this course will be prosecuted to the full extent of the university honor policy, including judicial action and the sanctions listed in paragraph XI of the Student Conduct Code. For serious violations, you will fail this course.

Software Use

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

Accommodations for Students with Disabilities

Please do not hesitate to ask for accommodation for a documented disability. Students requesting classroom accommodation must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drp/>). The Dean of Students Office will provide documentation to the student, who must then provide this documentation to the Instructor when requesting accommodation. Please ask the instructor if you would like any assistance in this process. Please provide this information to your TA within the first two weeks of the semester.

Instructor Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Drop/Add/Withdrawal

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

Additional Resources

Students facing difficulties completing the course or who are in need of counseling or urgent help may contact the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; or the University Police Department: 392-1111 or 9-1-1 for emergencies.

Other Resources available on-campus for students include:

- a. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
- b. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling;
- c. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

COURSE SCHEDULE (dates will be updated for Fall 2016)

Spring 2015 Week Of:	Week	Module	Fundamental Science Topic	Framework Topic	Skill	Other Activities	Reading in <i>'Dire Predictions'</i> , pages
4-Jan	1	Introduction to climate and CC	Disciplines of climate change	Interdisciplinary Science	Course Search		
11-Jan	2		Climate Drivers	Scientific Method	Formulate Hypotheses		6-31
18-Jan	3		Climate History	How Science is Done	Excel, Test Hypotheses		32-33, 40-43
25-Jan	4		Evidence for Anthro. CC	Uncertainty/Consensus	Sources/Critical thinking		34-46
1-Feb	5		CC and the Weather	Research and Big Data	Data Patterns	Intro. Semester Project (2 nd hr)	47-62
8-Feb	6		CC Projections	Models	Excel, Test Hypotheses		63-105
15-Feb	7	Problems and Solutions	Ecological Impacts of CC	Team Science	Team Work	Midterm Exam – Feb 16	107-127
22-Feb	8		Population/Consumption	Ethics /Sustainability	Calculation/Units	Field trip – Feb 21	128-139, 190-191
1-Mar			SPRING BREAK WEEK	-----	-----	-----	-----
8-Mar	9		Agriculture/ Land Use	Communicating Science	Communication	Semester Project (2nd hour)	141-153
15-Mar	10	Energy	From Lab to the Real	Calculation/Units		155-169	
22-Mar	11	CC Policy	Built Environment	Effecting Change	Incorporate Criticism	Midpoint Project Evaluation	166-183
29-Mar	12		Environmental Policy	Science in Action	Cost/Benefit Analysis		180-197
5-Apr	13		Sea Level Rise	Science in the Public	Debate		98-99, 110-113,

		Realm	148-149
12-Apr	14	----- Semester Project Presentations During Class -----	
19-Apr	15	----- Semester Project Paper & Individual Assessment Due April 24 -----	

GENERAL EDUCATION

This course fulfills a Physical Science (P) General Education requirement

General Education Objectives

General education physical science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-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.

Accomplishment of General Education Objectives

The general education objectives will be accomplished through the examination of the issue of climate change; climate science, climate change impacts, and approaches to finding solutions to the ‘wicked problem’ of climate change. Each week, students will study on-line material on a ‘hard science’ climate change (Fundamental) topic and a ‘doing science’ or ‘science and society (Framework) topic’. Then, in class meetings each week, the two topics will be brought together and reinforced by doing critical thinking and application exercises and discussions as well as in a semester project that brings together all the skills developed during the course.

General Education Student Learning Outcomes

The general education student learning outcomes describe the knowledge, skills and attitudes that students are expected to acquire while completing a general education course at the University of Florida. The SLOs fall into three areas: content, communication and critical thinking.

- Content: Students demonstrate competence in the terminology, concepts, methodologies and theories used within the program area.
- Students clearly and effectively communicate knowledge, ideas, and reasoning in written or oral forms appropriate to the program area.
- Critical Thinking: Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems.

General Education Student Learning Outcomes Assessment

Student mastery of Content, Communication, and Critical Thinking will be evaluated each week through on-line submission of quizzes, graded discussions, and answers to questions relating to the week’s in-class activity. However, final assessment of SLOs will be done using the final term project in-class presentation and term paper, which, together, represents 30% of a student’s grade.

Semester Project Evaluation Rubric

Criteria (Max Pts.)	Rating			Example
	OUTSTANDING (10 - 9 pts)	SATISFACTORY (8.9 - 7 pts)	UNSATISFACTORY (< 7 pts)	
CONTENT OVERALL	Students demonstrate complete competence in the terminology, concepts, methodologies and theories used within the discipline.	Students demonstrate some competence in the terminology, concepts, methodologies and theories used within the discipline.	Students demonstrate poor competence in the terminology, concepts, methodologies and theories used within the discipline.	
Concepts/Principles (10 pts)	Skillfully and insightfully applies concepts and principles	Interprets and applies concepts and principles	Fails to interpret and apply course concepts and principles	Strategy clearly articulated
Terminology (10 pts)	Demonstrates thorough knowledge and use of terminology	Demonstrates knowledge and use of terminology	Fails to demonstrate knowledge and use of terminology	
Methodologies (10 pts)	Demonstrates thorough knowledge and application of methods	Demonstrates knowledge and application of methods	Fails to demonstrate knowledge and application of methods	Poses a hypothesis Identified benefits and beneficiaries

				Sources shown
Points Earned: 30	30 - 27	26.9 - 21	< 21	
COMMUNICATION OVERALL	Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.	Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.	Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.	
Delivery (Oral for Presentation/Written for paper) (10 pts)	The presenter uses language that skillfully communicates meaning with clarity and fluency, and is virtually error free. For oral delivery, the presenter demonstrates polished performance through posture, gestures, eye contact, etc.	The presenter uses language that communicates meaning with clarity and fluency, with few errors. For oral delivery, the presenter demonstrates appropriate performance through posture, gestures, eye contact, etc.	Uses language that impedes meaning because of errors in usage. For oral delivery, the presenter fails to demonstrate appropriate performance through posture, gestures, eye contact etc.	Visual resources (figures/tables) incorporated
Organization (10 pts)	Organizational structure is clearly and consistently recognizable	Organizational structure is understood	Organizational structure is not recognizable	Presented outline and followed it (methods, conclusion, etc)
Points Earned: 20	20 - 18	17.9 - 14	< 14	
CRITICAL THINKING OVERALL	The assignment is focused, coherent, and successfully integrates examples with explanations, supporting evidence and analysis.	The assignment is reasonably focused. Fewer connections are made between ideas and new insights are offered are not well-developed.	The assignment is mostly description or summary, without consideration or support of evidence. Generally unfocused and no connections made between ideas.	
Explanation of Issues (10 pts)	Comprehensively identifies and summarizes main issues, explaining how they create questions; identifies embedded issues, addressing their relationship to each other.	Identifies and summarizes the main issues, and explains why they constitute problems or create questions.	Fails to identify, summarize, and explain the main problem or question. Represents the issues inaccurately or inadequately.	
Evidence/Analysis (10 pts)	Skillfully uses high quality, relevant sources to rigorously investigate subject; logically analyzes multiple alternate points of view, revealing important differences or similarities within the topic.	Uses credible, relevant sources to question and analyze alternate points of view, revealing some differences or similarities within the topic.	Fails to demonstrate proper use of sources to support ideas. Shows little to no awareness of evidence and bases analysis on a single source or unclear evidence.	
Conclusion (10 pts)	Comprehensively discusses implications and conclusions considering all relevant evidence. A clear and precise point of view and appropriate conclusion are presented.	Discusses implications and conclusions, considering relevant data and evidence. A credible point of view or conclusion is presented.	Fails to formulate and clearly express a credible point of view and does not consider the evidence and data when forming judgments.	
Points Earned: 30	30 - 27	26.9 - 21	< 21	
Total: 80 Points	80 - 72	71.9 - 56	< 56	

Selected Examples of 'Spark Discussions' to be used (These are discussion done before viewing any on-line content, meant get the thought juices flowing and preconceptions realized and shared):

1. Relate an interesting scientific experiment you did (either as a child or recently, in school or informally). If you really draw a blank, you can tell about a famous one you may have heard about (not already mentioned by another student). Tell what your hypothesis was if you had one, method and the results. (about 4 sentences). Make 1 substantive comment about someone else's experiment.

2. The U.S. government distributes about \$50 million each year for paleoclimate research, study of climates in Earth's past (hard to give an exact number since this money comes from a variety of separate programs at NSF,

NOAA, NASA, operation of a deep sea drilling ship). What do you think of when you think of Earth's past climate? Why do you think it would be so important to understand climates of the past?

3. Let's define anthropogenic global warming (AGW) as the theory that human beings are responsible for increasing atmospheric GHG, which has contributed to recent (last 50-100 years) warming of the Earth and other climate changes (that would not have occurred otherwise). Recount an experience you have had where someone expressed to you an argument against or doubts about AGW theory (or why we as a society shouldn't do anything about AGW) - what did they say? A personal experience would be best but if you have none, something you may have read or heard in the media would suffice.

Selected Examples of Readings that will be assigned (in addition to most of the 200 page textbook):

Peer Reviewed Research

Fudge, D., Fifty years of J. R. Platt's strong inference. *The Journal of Experimental Biology* (2014) 217, 1202-1204 doi:10.1242/jeb.104976.

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

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.

Teigen, K.H., When very likely is not so likely. *NATURE CLIMATE CHANGE*, 4: 2014.

Doran and Zimmerman, 2009. Examining the Scientific Consensus on Climate Change, *Eos*, VOLUME 90 NUMBER 3. DOI: 10.1029/2009EO030002.

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

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

Retchless, D., Frey, N., Wang, C., Hung, L., Yarnal, B. 2014. Climate extremes in the United States: recent research by physical geographers. *Physical Geography*, 35:1, 3-21.

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.

Twenty Landmark Papers in Biodiversity Conservation. Chapter 6: Twenty Landmark Papers in Biodiversity Conservation. By: Bradshaw, N. S. Sodhi, W. F. Laurance, B. W. Brook. In *Research in Biodiversity - Models and Applications* (2011).

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

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

The Popular Press

The Real Scientific Consensus on Climate Change <http://www.foxbusiness.com/business-leaders/2014/06/05/real-scientific-consensus-on-climate-change/>

The Seven Warning Signs of Bogus Science <http://www.quackwatch.com/01QuackeryRelatedTopics/signs.html>

NOVA scienceNow video on Tropical Ice Cores Measure Climate, http://www.pbslearningmedia.org/asset/clim10_vid_icecores/

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

Government Agencies

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

IPCC 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/>

IPCC Special Reports, Chapter 5, Emissions Scenarios (SRES). <http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=0>

IPCC Special Report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) Chapter 3: Changes in Climate Extremes and their Impacts on the Natural Physical Environment http://ipcc-wg2.gov/SREX/images/uploads/SREX-Chap3_FINAL.pdf

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

Specific sections: Executive Summary p. 111-114, Section 3.2 Requirements and Methods for Analyzing Changes in Extremes 3.2.1 Observed Changes p. 122 – 125 (skip box), Box 3-2 p. 132 ~ 6 pages of reading

NOAA/NCDC report on billion dollar weather and climate events from 1980-2003 <http://www1.ncdc.noaa.gov/pub/data/techrpts/tr200301/tr2003-01.pdf>

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

NOAA National Climatic Data Center: <http://www.ncdc.noaa.gov/cag/time-series/us>

Academic Resources

On Science: http://undsci.berkeley.edu/article/0_0_0/us101contents_01

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

SENSE ABOUT SCIENCE, MAKING SENSE OF UNCERTAINTY, 2013. <http://www.senseaboutscience.org/resources.php/127/making-sense-of-uncertainty>

Naomi Oreskes on the Merchants of Doubt, <https://www.youtube.com/watch?v=wX3y6BQd4LI>

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

Non-Governmental Agencies

Climate Drivers <http://co2now.org/Know-the-Changing-Climate/Climate-System/ipcc-explains-earths-climate-system.html>

Selections from Climate Change Reconsidered II – Physical Science. Published for the Nongovernmental International Panel on Climate Change (NIPCC). Heartland Institute. 2013.

Can we live inside the doughnut? Why the world needs planetary and social boundaries: <http://blogs.oxfam.org/en/blog/12-02-13-can-we-live-inside-doughnut-why-world-needs-planetary-and-social-boundaries>

Southeast Climate Consortium's agroclimate website climate fact sheets. <http://agroclimate.org/fact-sheets-climate.php>