

SAN JOSE STATE UNIVERSITY

METEOROLOGY 112, Sec. 4
GLOBAL CLIMATE CHANGE
Fall 2012 – Course # 43572
MW 1445 – 1545 (2:45 – 3:45 PM)
Office: Duncan Hall 621

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Course Description:

Meteorology 112 is a SJSU Studies (formerly advanced General Education) course in area “R”, Earth and Environment. This course will help students become integrated thinkers who can see connections between and among a variety of concepts and ideas.

This course introduces students to the science of global climate change including how the interactions among the various elements in the earth’s planetary ecosystem have affected past climates, are shaping today’s climate and will likely affect future climate. Over the past decade or so, the issue of ‘global warming’ has become one of the world’s most pressing environmental and social concerns.

Prerequisite: Completion of core GE, *satisfaction of Writing Skills Test* and upper division standing. For students who began continuous enrollment at a CCC or a CSU in Fall 2005 or later, completion of (or co-requisite in) a 100W course is required.

TEXTS:

Robert Henson, *The Rough Guide to Climate Change*, third edition, Penguin Group (USA), New York, 2011 (paperback)
ISBN 13: 978-1848365797
ISBN 10: 1848365799

Fred Pearce, *With Speed and Violence*, second edition, Beacon Books, Boston, 2008 (paperback)
ISBN 13: 978-0-8070-8577-6
ISBN 10: 0-8070-8577-4

Lester Brown, *Plan B 4.0: Mobilizing to Save Civilization*, W. W. Norton, New York, 2009 (paperback) – OPTIONAL (HIGHLY RECOMMENDED)

Bill McKibben, *Eaarth: Making a Life on a Tough New Planet*, St. Martin’s Griffin, 2011 (paperback) -- OPTIONAL (HIGHLY RECOMMENDED)

Mark Hertsgaard, *HOT: Living Through the Next Fifty Years on Earth*, Houghton Mifflin Harcourt, New York, 2011 (hardcover) – OPTIONAL (HIGHLY RECOMMENDED)

Additional reference: J. T. Houghton, *Global Warming – The Complete Briefing*, third edition, Cambridge University Press, New York, 2004 (paperback)

These books are presently available both new and used on Amazon and other online retailers.

Office Hours: MW 1445 -- 1545 (or by appointment)

If, at any time, you have difficulty with the course material, please come and see me. Bring all relevant materials, e.g., quizzes, exams, notebook, textbook(s), other resources.

GE Information (from catalog)

SJSU studies (formerly Advanced GE)

- Students must complete one course in each area.
- For students who began continuous enrollment Fall 2005 or later, courses used to satisfy Areas R, S, and V must be taken from three separate SJSU departments or other distinct academic units.
- METR 112 satisfies the requirements for *area R*.

Area R Learning Objectives – A student should be able to:

- demonstrate an understanding of the methods and limits of scientific investigation.
- distinguish science from pseudo-science.
- apply a scientific approach to answer questions about the earth and environment.

Course Learning Objectives – developing an understanding of, and ability to articulate:

- the fundamental processes responsible for past and present climate change – and how both natural factors and human actions can set such processes in motion
- connections between materials consumption, energy use, and global climate change
- implications and uncertainties related to our changing climate, including possible impacts on human societies (and economies) and natural ecosystems
- various strategies for mitigation of climate change

COURSE TOPICS

- I. Global warming and climate change
 - A. The challenge
 - B. Highlights of the IPCC Fourth Assessment
- II. Basic energy concepts
 - A. Radiative balance, albedo and the greenhouse effect
 - B. Mars vs. Earth vs. Venus
 - C. Runaway greenhouse, enhanced greenhouse effect
- III. Greenhouse gases, aerosols and radiative forcing
 - A. Carbon dioxide and the carbon cycle
 - B. Other greenhouse gases and effects of particles

- IV. Elements of the climate system
 - A. Atmosphere
 - B. Hydrosphere
 - C. Cryosphere
 - D. Land surfaces
 - E. Biosphere

- V. Past climates
 - F. Recent (past 100 years)
 - G. Post-glacial climate
 - H. Geological time scales
 - I. IPCC Fourth Assessment

- VI. Climate modeling
 - A. Numerical weather prediction
 - B. Modeling the climate system and feedbacks
 - C. Validation of the models

- VII. Changes in the 21st century
 - A. Emissions scenarios
 - B. Global average temperature projections
 - C. Regional patterns of climate change

- VIII. The impacts of climate change
 - A. Networks of change
 - B. Sea-level rise
 - C. Fresh water resources
 - D. Agricultural impacts
 - E. Ecosystems
 - F. Extreme events

- IX. Uncertainties
 - A. General considerations
 - B. The IPCC assessments
 - C. Why not wait and see?
 - D. Arguments for action – the Precautionary Principle

- X. Stabilization and mitigation strategies
 - A. The climate convention
 - B. Montreal and Kyoto protocols
 - C. The fate of the forests
 - D. Energy demands and supplies

To get all of the information you need to do well on quizzes and exams, you will need to read the texts and attend the lectures.

- We will discuss in the class the work of the International Panel on Climate Change (IPCC), whose Fourth Assessment Report (AR4) was released in stages over the course of 2007. The IPCC shared the Nobel Peace Prize recently with Al Gore. Sections of AR4 can be downloaded at <http://www.ipcc.ch/>. These include each of the three Working Groups Reports (“Physical Science Basis”, “Impacts, Adaptation and Vulnerability” and “Mitigation of Climate Change”) as well as the AR4 Synthesis Report released last November. The Summaries for Policy Makers in each of these four groups highlight the salient points.

GRADING

Grades will be based on the **best 3** of 4 quizzes, a midterm exam, a final exam, and various writing assignments. The quizzes will consist of short-answer, multiple choice and fill-in-the-blank questions; exams will include a few questions that will require a longer answer (i.e., a half page or so). **The final exam will be comprehensive.** The GE writing requirement (3,000 words total or ~12 pages) will be satisfied in two ways: homework assignments (six pages total writing) and in-class writing (six pages total writing). Table 1 below gives the point values for quizzes, exams, and writing assignments; Table 2 tells you how the course grade will be calculated.

TABLE 1. Point values for quizzes, exams, and writing assignments.

QUIZZES (3):	60 POINTS
MIDTERM EXAM	60 POINTS
FINAL EXAM	60 POINTS
WRITING (in-class plus homework)	30 POINTS
TOTAL	210 POINTS

TABLE 2. Point ranges to receive indicated grade.

Total Points	Grade
203 and up	A+
196 – 202	A
189 – 195	A-
182 – 188	B+
175 – 181	B
168 – 174	B-
161 – 167	C+
154 – 160	C
147 – 153	C-
140 – 146	D+
133 – 139	D

126 – 132	D-
Below 126	F

Grading Policies

Quizzes: As only three quizzes are counted, there will be **no make-ups** for missed quizzes.

Midterm Exam -- Make-ups will be given *if* a **compelling** reason is given for missing the exam. The make-up exam must be taken before the graded exams are returned.

Homework: Homework is due at the *beginning* of class. Late Homework will result in a deduction of points as follows:

- Less than 24 hours late: 20%
- 24 to 48 hours late: 50%
- More than 48 hours late: 100%

In-class activities: Each class activity will be worth 5 points. You may miss one activity without penalty. **There will be no make-ups** of in-class activities.

Incompletes:

An "incomplete" will be given for the course only under the following conditions:

1. At least 60% of the course work has been completed **and**
2. *Unexpected* circumstances prevent the completion of the remaining work.

An incomplete will **not** be given to circumvent rules concerning the dropping of courses!

Cell phones, lap-top computers, etc.:

Please show consideration for me and for your fellow students by turning off the ringer on your cell phone during class – and not answering cell phones during class. Lap-top computers should be used only for note-taking (if that is your habit/preference). Any abuse of lap-top use in class will result in the banning of their use in the classroom for ALL students!

Punctuality, etc. :

Please make every effort to arrive *on time*.

Please do not start making preparations to leave (e.g., closing notebooks) prior to the scheduled end of the class.

Please inform me if you need to leave class early; try to take a seat near the front of the classroom to avoid disruption of the class as you leave.

How to do well in this course

- **Attend class!**

- **Use the materials available on the web pages to which you will be referred.**
- Put in the time! Rule of thumb: **two hours** of study for each hour in the classroom.
- **Don't fall behind!** Review your notes regularly.
- **Don't just memorize!** Try to tie things together. Ask yourself, "How does this new material fit in with the previous topics?" or "How would I explain this to someone else?"
- Keep a well-organized notebook. At the very least, note the date of the lecture. Better yet, re-write the notes and insert your own comments.
- When studying, jot down questions about things you don't understand.
- Use reference materials, e.g., a good dictionary, the web, to fill in gaps in your background knowledge. (E.g., if you don't know the meaning of a word or some important geographical fact, look it up!)
- Form a study group. (And remember, group meetings don't do any good unless all of the participants have prepared beforehand!)

University Policies

Academic Integrity (*from the Office of Judicial Affairs*):

"Your own commitment to learning as evidenced by your enrollment at San Jose State University, and the University's Academic Integrity Policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Judicial Affairs." The policy on academic integrity can be found at the following website: <http://www2.sjsu.edu/senate/S04-12.pdf> . THIS CLASS: CHEAT → F !

Disabilities: "If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me, or see me during office hours. Presidential directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability."

Schedule for Class Reading and Discussion

The very first things to read (while people are still getting their books for this course) are the following:

-- "New Yorker" article (eight pages long, from a few years ago), at
< http://www.newyorker.com/reporting/2008/07/07/080707fa_fact_kolbert > ;

-- "New Internationalist" article on climate-change denial, at
< <http://dl.dropbox.com/u/7094851/ClimateChangeDenial-NI.pdf> > ;

-- my little piece on fun and insights with the scientific method, at
< <http://dl.dropbox.com/u/7094851/wordgame.doc> > .

The first quiz for the semester (around the third week) will cover these.

MET112 REQUIRED COURSE TEXTBOOKS

by	HENSON		PEARCE
1/31	1 - 31		
2/ 7	32 - 74	.....	everything up to p.3
2/14	171 - 226	.....	3 - 17
2/21	227 - 277	.....	18 - 31
2/28	75 - 105	.....	35 - 59
3/ 6	106 - 146	.....	63 - 98
3/13	147 - 168	.....	101 - 123
3/20	278 - 332	.....	127 - 164
4/ 3	335 - 366	.....	167 - 197
4/10	REVIEW	.....	201 - 221
4/17	REVIEW	.....	225 - 271
4/24	REVIEW	.....	REVIEW
5/ 1	REVIEW	.....	REVIEW
5/ 8	REVIEW	.....	REVIEW
5/15	REVIEW	.....	REVIEW

FINAL EXAM: TUESDAY, MAY 22, 1215 - 1430

FIRST WRITTEN HOMEWORK ASSIGNMENT (DUE MONDAY, SEPTEMBER 10, AT 1330):

Please bring in an account of your observations, handwritten or typed, to our sixth class meeting, Mon., Sept.10, 2012, and hand in at the beginning of class. Thanks! (NOTE: For this assignment, we are NOT using D2L.)

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1. When you put some ice (cubes or chunks) in a glass of water, you'll notice that the water level rises to a new level. MARK that new level

(say, with tape or a marker pen) on the outside of the glass, and then go away for an hour or more and let the ice melt. NOTE: The ice you put into the glass must NOT TOUCH THE BOTTOM; it should be ALL FLOATING. Here's the question, whose answer you determine from observation and write up for this assignment: After the ice has all melted, WHAT HAS HAPPENED TO THE WATER LEVEL IN THE GLASS? (Did it go up, down, or stay the same?) DON'T WRITE UP WHAT YOU THINK WOULD HAPPEN; DO THE EXPERIMENT! You may well be quite surprised at the result!

2. a. Go watch the sky for awhile (or just off-and-on, over a period of a few minutes or more) at sunset (or sunrise, if you prefer). Try to determine which way the sun goes down (if at sunset — or UP, if at sunrise), as you face it. Is the sun going down-and-to-the-LEFT, or STRAIGHT down, or down-and-to-the-RIGHT? If you're sighting the sun against some distant building, tower, tree, etc., and go out a couple or several different times while doing this exercise, make sure you're observing from the SAME SPOT each time you look. (You can make drawings or take pictures, if you want — not required, though.)
- b. Try to determine, by observing sunset (or sunrise) on two or more different days very soon, whether the sunset point on the horizon (or the sunrise point on the horizon) is staying in the same position, or moving to the LEFT, or moving to the RIGHT, from day to day. (This set of observations can be made on consecutive days, but it would be better to have at least two of your observations be a FEW days apart, so you'll be able to better notice any changes in the sun's position along the horizon.

Have fun with these!

-- Joe J.

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One website on which you will be required to view a very interesting and entertaining video is "The Story of Stuff" (< <http://www.storyofstuff.com> >). Sometime around the middle of the semester, there will be an in-class writing (to be graded) on the ideas presented in that piece. A couple of long (~2-hr.) videos that will also be required viewing are an excellent special from the PBS series "Frontline", entitled "HEAT" (< <http://video.pbs.org/video/994540147/> >); the film "An Inconvenient Truth" (Al Gore's infamous piece); and the BBC film "Snowball Earth". (There was also an article in "Scientific American" magazine about this theory, some years ago; that would be worth looking up and reading, too.) You will be writing and turning in papers on the latter two, sometime in the second half of this semester — but might as well **get started** on finding and reading/viewing these things, NOW (or soon)!

There will occasionally be other readings (and/or viewings) assigned from websites or other resources.

EXTRA-CREDIT BOOKS (and other opportunities):

There are two books you can read and study to gain some extra credit for this course. By successfully answering a variety of questions (at a point toward the end of the semester) on either one of them, you can achieve up to 7 additional points toward your final grade – and up to 15 if you do both.

George Monbiot, *Heat: How to Stop the Planet From Burning*, Penguin Books, London, 2006 or later (paperback) – ***ON RESERVE AT MLK LIBRARY***

ISBN 13: 978-0896087873

ISBN 10: 0896087875 [NOTE difference in last digit.]

Tim Flannery, *The Weathermakers: How Man Is Changing the Climate and What It Means for Life on Earth*, Atlantic Monthly Press, New York, 2005 (hardcover)

ISBN 13: 978-0-87113-935-1

ISBN 10: 0-87113-935-9 [NOTE difference in last digit.]

There will be occasional other extra credit opportunities (“ECOs”), potentially adding a total of just a few more points to your overall score.